# PREFACE

The following describes the information location, layout, and editorial conventions in the Indian Point Energy Center (IPEC) License Renewal Application (hereinafter referred to as “this application” or “the application”). This application seeks renewal for an additional 20-year term of the facility operating licenses (FOL) for IPEC Units 2 and 3 (IP2 and IP3).

Abbreviated names and acronyms used throughout the application are defined at the end of this preface. Commonly understood terms (such as U.S.) and terms used only in referenced document numbers may not be identified in this table. Regulatory documents such as NUREG-1801, *Generic Aging Lessons Learned (GALL) Report*, Revision 1, and 10 CFR 54, “Requirements for Renewal of Operating Licenses for Nuclear Power Plants,” are referred to by the document number, i.e., NUREG-1801 and 10 CFR 54, respectively. References to the UFSAR are to the IPEC Updated Final Safety Analysis Report.

Section 1 provides administrative information required by 10 CFR 54.17 and 10 CFR 54.19.

Section 2 describes and justifies the methods used to determine the systems and structures within the scope of license renewal and the structures and components subject to aging management review. The results of the system and structure scoping are provided in Tables 2.2-1 through 2.2-4. Tables 2.2-1a-IP2, 2.2-1a-IP3, 2.2-1b-IP2, 2.2-1b-IP3 and 2.2-3 list mechanical systems for IP2 and IP3, electrical systems for IP2 and IP3, and structures, respectively, within the scope of license renewal. Tables 2.2-2-IP2, 2.2-2-IP3, and 2.2-4 list the systems for IP2 and IP3 and structures, respectively, not within the scope of license renewal. Section 2 also provides descriptions of in-scope systems and structures and their intended functions with tables identifying components and commodities requiring aging management review and their component intended functions. References are provided to the results of the aging management reviews in Section 3. The descriptions of systems in Section 2 identify license renewal drawings that depict components subject to aging management review for mechanical systems. The drawings are provided in a separate submittal.

Section 3 describes the results of aging management reviews of mechanical, electrical and structural components requiring aging management review. Section 3 is divided into sections that address (1) the reactor vessel, internals, and reactor coolant system, (2) engineered safety features, (3) auxiliary systems, (4) steam and power conversion systems, (5) containment, structures, and component supports, and (6) electrical and instrumentation and controls. The tables in Section 3 provide a summary of information concerning aging effects requiring management and applicable aging management programs for component and commodity groups subject to aging management review. The information presented in the tables is based on the format and content of NUREG-1800, *Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants*, Revision 1, U.S. Nuclear Regulatory Commission, September 2005. The tables include comparisons with the evaluations documented in NUREG-1801, *Generic Aging Lessons Learned (GALL) Report*, Revision 1, U.S. Nuclear Regulatory Commission, September 2005.

Section 4 addresses time-limited aging analyses, as defined by 10 CFR 54.3. It includes identification of the component or subject and an explanation of the time-dependent aspects of the calculation or analysis. Section 4 demonstrates whether (1) the analyses remain valid for the period of extended operation, (2) the analyses have been projected to the end of the period of extended operation, or (3) the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

Section 4 also confirms that no 10 CFR 50.12 exemption involving a time-limited aging analysis as defined in 10 CFR 54.3 is required during the period of extended operation. The information in Section 4 fulfills the requirements in 10 CFR 54.21(c).

Appendix A, Updated Final Safety Analysis Report Supplement, provides a summary description of programs and activities for managing the effects of aging for the period of extended operation. A summary description of the evaluation of time-limited aging analyses for the period of extended operation is also included. Following issuance of the renewed license, the material contained in this appendix will be incorporated into the UFSAR. The information in Appendix A fulfills the requirements in 10 CFR 54.21(d).

Appendix B, Aging Management Programs, describes aging management programs and activities that will manage aging effects on components and structures within the scope of license renewal such that they will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation. Appendix B contains a comparison of site programs to the programs evaluated in NUREG-1801. The information in Section 2, Section 3, and Appendix B fulfills the requirements of 10 CFR 54.21(a).

Appendix C is not used.

Appendix D, concludes that no technical specification changes are necessary to manage the effects of aging during the period of extended operation. The information in Appendix D fulfills the requirements in 10 CFR 54.22.

Appendix E is the environmental information which fulfills the requirements of 10 CFR 54.23 and 10 CFR 51.53(c).

# ABBREVIATIONS AND ACRONYMS

| **Abbreviation or Acronym** | **Description** |
|---|---|
| AC | alternating current |
| ACI | American Concrete Institute |
| ACSR | aluminum conductor steel reinforced |
| ADV | atmospheric dump valve |
| AEM | aging effect/mechanism |
| AFW | auxiliary feedwater |
| AMA | ammonia / morpholine addition |
| AMP | aging management program |
| AMR | aging management review |
| AMSAC | ATWS Mitigating System Actuation Circuitry |
| ANSI | American National Standards Institute |
| ARDG | Appendix R diesel generator |
| ART | adjusted reference temperature |
| AS | auxiliary steam |
| ASC | auxiliary steam and condensate return |
| ASME | American Society of Mechanical Engineers |
| ASTM | American Society for Testing and Materials |
| ATWS | anticipated transient without scram |
| | |
| B&PV | Boiler and Pressure Vessel |
| BLCA | boron and layup chemical addition |
| BMI | bottom mounted instrumentation |
| BVS | building vent sampling |
| BWR | boiling water reactor |
| | |
| CAR | condenser air removal |
| CASS | cast austenitic stainless steel |
| CBHV | control building HVAC |

| **Abbreviation or Acronym** | **Description** |
|---|---|
| CCC | conventional closed cooling |
| CCF | containment cooling and filtration |
| CCR | central control room |
| CCW | component cooling water |
| CE | conducts electricity |
| CETNA | core exit thermocouple nozzle assembly |
| CF | chemical feed system, chemistry factor |
| CFR | Code of Federal Regulations |
| CII | containment inservice inspection |
| CISS | containment isolation support systems |
| CL | chlorination |
| CLB | current licensing basis |
| $CO_2$ | carbon dioxide |
| COND | condensate |
| CP | condensate polisher |
| CPD | condensate pump discharge |
| CPS | condensate pump suction |
| CRD | control rod drive |
| CRDM | control rod drive mechanism |
| CRHV | control room HVAC |
| CS, CSS | containment spray, containment spray system |
| CST | condensate storage tank |
| Cu | copper |
| CUF | cumulative usage factor |
| CVCS | chemical and volume control |
| $C_VUSE$ | Charpy upper-shelf energy |
| CW | circulating water |
| CWM | city water makeup |
| CXFR | condensate transfer |

| Abbreviation or Acronym | Description |
|---|---|
| CYW | city water |
| DBA | design basis accident |
| DC | direct current, batteries and 125V DC system |
| DOCK | intake structure (IP2) |
| DW | demineralized water |
| EDG | emergency diesel generator |
| EFPY | effective full power years |
| EG | emergency generators |
| EIC | electrical and instrumentation and control |
| EMA | equivalent margin analysis |
| EN | shelter or protection |
| EOL | end of life |
| EP | electrical penetrations |
| EPRI | Electric Power Research Institute |
| EQ | environmental qualification |
| ER | Environmental Report (Applicant’s Environmental Report—Operating License Renewal Stage) |
| ESF | engineered safety features |
| ESS | engineered safeguards initiation logic |
| EX | extraction steam |
| ext | external |
| FAC | flow-accelerated corrosion |
| FB | fire barrier |
| FBAR | fire barriers |
| FC | flow control |
| FCCH | fuel and core component Handling |
| FD | flow distribution, floor drains |

| Abbreviation or Acronym | Description |
|---|---|
| FDA | fire detection and alarms |
| $F_{en}$ | fatigue life correction factor |
| FERC | Federal Energy Regulatory Commission |
| FHS | fuel handling system |
| FLB | flood barrier |
| FLT | filtration |
| FO | fuel oil |
| FP | fire protection |
| FRW | fire water |
| FSAR | Final Safety Analysis Report |
| FSBHV | fuel storage building HVAC |
| ft-lb | foot-pound |
| FW | feedwater |
| FWC | fresh water cooling |
| FWP | main feedwater pump and services |
| FWST | fire water storage tank |
| GALL | NUREG-1801, Generic Aging Lessons Learned Report |
| GEN | main generator |
| GL | Generic Letter |
| GSI | Generic Safety Issue |
| GSS | gland seal steam |
| GT | gas turbine |
| GWD | gaseous waste disposal |
| HA | hydrazine addition |
| HD | heater drain / moisture separator drains/vents |
| HELB | high-energy line break |
| HEPA | high efficiency particulate air |

| Abbreviation or Acronym | Description |
|---|---|
| HR | hydrogen recombiners |
| HPSD | high pressure steam dump |
| HPSI | high pressure safety injection |
| HS | heat sink |
| HSB | house service boiler |
| HT | heat transfer |
| HVAC | heating, ventilation, and air conditioning |
| I&C | instrumentation and controls |
| IA | instrument air |
| IACC | instrument air closed cooling |
| IASCC | irradiation-assisted stress corrosion cracking |
| ICI | in-core instrumentation |
| ID | inside diameter, identification |
| IGO | ignition oil |
| IGSCC | inter-granular stress corrosion cracking |
| ILRT | integrated leak rate testing |
| ILWH | integrated liquid waste handling |
| IN | Information Notice, insulation (electrical) |
| INCOR | incore nuclear instrumentation |
| INS | insulation |
| int | internal |
| IP2 | Indian Point Energy Center Unit 2 |
| IP3 | Indian Point Energy Center Unit 3 |
| IPA | integrated plant assessment |
| IPEC | Indian Point Energy Center |
| IR | insulation resistance |
| ISG | Interim Staff Guidance |
| ISI | inservice inspection |

| **Abbreviation or Acronym** | **Description** |
|---|---|
| IVSW | isolation valve seal water |
| KV or kV | kilo-volt |
| LAFW | loss of auxiliary feedwater |
| LAS | low alloy steel |
| LBB | leak before break |
| LPSD | low pressure steam dump |
| LO | lube oil |
| LOCA | loss of coolant accident |
| LRA | license renewal application |
| LWD | liquid waste disposal |
| MB | missile barrier |
| MFW | main feedwater |
| MIC | microbiologically influenced corrosion |
| MS | main steam |
| MSCL | miscellaneous |
| MSIV | main steam isolation valve |
| MTG | main turbine generator |
| MWe | megawatts-electric |
| MWt | megawatts-thermal |
| N2 | nitrogen system, nitrogen gas |
| NA | neutron absorption, not applicable |
| $n/cm^2$ | neutrons per square centimeter |
| NDE | non-destructive examinations |
| NED | nuclear equipment drains |
| NEI | Nuclear Energy Institute |

| **Abbreviation or Acronym** | **Description** |
|---|---|
| NFPA | National Fire Protection Association |
| Ni | nickel |
| NPS | nominal pipe size |
| NRC | Nuclear Regulatory Commission |
| NSG | nuclear service grade makeup |
| NYPA | New York Power Authority |
| $O_2$ | oxygen |
| PAB | primary auxiliary building |
| PABHV | primary auxiliary building HVAC |
| PACS | post-accident containment air sample |
| PACV | post-accident containment vent |
| PB | pressure boundary |
| pH | potential of hydrogen |
| PORV | power-operated relief valve |
| ppm | parts per million |
| PRM | process radiation monitor |
| PS | primary plant sampling |
| PSPM | periodic surveillance and preventive maintenance |
| PSS | primary sampling |
| P-T | pressure-temperature |
| PT | penetrant testing |
| PTS | pressurized thermal shock |
| PV | plant vent |
| PVC | polyvinyl chloride |
| PW | primary water makeup |
| PWR | pressurized water reactor |
| PWSCC | primary water stress corrosion cracking |

| **Abbreviation or Acronym** | **Description** |
|---|---|
| PZR | pressurizer |
| QA | quality assurance |
| RCCA | rod cluster control assembly |
| RCP | reactor coolant pump |
| RCPB | reactor coolant pressure boundary |
| RCS | reactor coolant system |
| RG | Regulatory Guide |
| RHR | residual heat removal |
| RMS | radiation monitoring |
| RO | refueling outage |
| RPC | reactor protection and control |
| RPV | reactor pressure vessel |
| RS | reheat steam |
| $RT_{NDT}$ | reference temperature (nil-ductility transition) |
| $RT_{PTS}$ | reference temperature for pressurized thermal shock |
| RVID | Reactor Vessel Integrity Database |
| RVLIS | reactor vessel level indication |
| RW | radioactive waste, river water service system |
| RWST | refueling water storage tank |
| $S_A$ | stress allowables |
| SA | station air |
| SAMA | severe accident mitigation alternatives |
| SBO | station blackout |
| SCC | stress corrosion cracking |
| SD | steam generator boiler blowdown system |
| SE, SER | Safety Evaluation, Safety Evaluation Report |

| **Abbreviation or Acronym** | **Description** |
|---|---|
| SEC | security |
| SECHV | security building HVAC |
| SFPC | spent fuel pit/pool cooling, spent fuel pit and cooling |
| SG | steam generator, steam generator secondary side instrumentation (system) |
| SGBD | steam generator blowdown |
| SGBDR | steam generator blowdown recovery |
| SGLC | steam generator level control |
| SGS | steam generator sampling |
| SI | safety injection / recirculation |
| SIS | safety injection system |
| SNS | support for Criterion (a)(2) equipment |
| SO | [main generator] seal oil |
| $SO_2$ | sulfur dioxide |
| SPG | security propane generator |
| SPU | stretch power uprate |
| SR | surveillance requirement |
| SRE | support for Criterion (a)(3) equipment |
| SS | secondary plant sampling, stainless steel |
| SSC | system, structure, or component |
| SSFS | safety system function sheets |
| SSR | support for Criterion (a)(1) equipment |
| SSS | secondary sampling |
| STR | structural support |
| SW, SWS | service water |
| TLAA | time-limited aging analysis (analyses) |
| TB | turbine building |
| TGHC | turbine generator hydraulic control |

| **Abbreviation or Acronym** | **Description** |
|---|---|
| THCC | turbine hall closed cooling |
| TS | traveling screen |
| TSC | technical support center |
| TSCD | technical support center diesel |
| TURB | main turbine |
| UFSAR | Updated Final Safety Analysis Report |
| USE | upper-shelf energy |
| UT | ultrasonic testing |
| VCHA | vapor containment hydrogen analyzer |
| VCHVP | vapor containment purge and supply |
| VCPR | vapor containment pressure relief |
| VCV | vapor containment building ventilation |
| WCAP | Westinghouse Commercial Atomic Power |
| WCCPP | weld channel and containment penetration pressurization |
| WCPS | weld channel and penetration pressurization system |
| WDS | waste disposal system |
| WHTP | waste holdup tank pit |
| WTP | water treatment plant |
| WW | wash water |
| yr | year |
| Zn | zinc |
| 1/4 T | one-fourth of the way through the vessel wall measured from the internal surface of the vessel |

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# 1.0 ADMINISTRATIVE INFORMATION

Pursuant to Part 54 of Title 10 of the Code of Federal Regulations (10 CFR 54), this application seeks renewal for an additional 20-year term of the facility operating licenses (FOL) for Indian Point Energy Center (IPEC), Units 2 and 3. For Indian Point Energy Center Unit 2 (IP2), the facility operating license (DPR-26) expires at midnight September 28, 2013. For Indian Point Energy Center Unit 3 (IP3), the facility operating license (DPR-64) expires at midnight December 12, 2015. These applications apply to renewal of the source, special nuclear, and by-product materials licenses that are combined in the facility operating licenses.

The application is based on guidance provided by the U.S. Nuclear Regulatory Commission in NUREG-1800, *Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants*, Revision 1, September 2005, and Regulatory Guide 1.188, "Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses," Revision 1, September 2005, and guidance provided by NEI 95-10, *Industry Guidelines for Implementing the Requirements of 10 CFR 54 - The License Renewal Rule*, Revision 6, June 2005.

The license renewal application is intended to provide sufficient information for the NRC to complete its technical and environmental reviews pursuant to 10 CFR Parts 54 and 51, respectively. The license renewal application is designed to allow the NRC to make the findings required by 10 CFR 54.29 in support of the issuance of renewed facility operating licenses for IPEC.

## 1.1 GENERAL INFORMATION

Following is the general information required by 10 CFR 54.17 and 10 CFR 54.19.

### 1.1.1 Name of Applicants

Entergy Nuclear Indian Point 2, LLC
Entergy Nuclear Indian Point 3, LLC
Entergy Nuclear Operations, Inc.

### 1.1.2 Address of Applicants

Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, New York 10601

Entergy Nuclear Indian Point 2, LLC, and Entergy Nuclear Indian Point 3, LLC, share the same address.

Indian Point Energy Center
450 Broadway
P.O. Box 249
Buchanan, New York 10511

### 1.1.3 Description of Business of Applicants

Entergy Nuclear Indian Point 2, LLC, and Entergy Nuclear Indian Point 3, LLC, are engaged principally in the business of owning all or part of a nuclear power facility and selling electric energy at wholesale in the United States. Entergy Nuclear Operations, Inc., is engaged principally in the business of operating nuclear power facilities. These entities are hereinafter referred to as “the applicants.”

### 1.1.4 Legal Status and Organization

Entergy Nuclear Indian Point 2, LLC, and Entergy Nuclear Indian Point 3, LLC, are indirect wholly owned subsidiaries of Entergy Corporation and indirect wholly owned subsidiaries of Entergy Nuclear Operations, Inc. The principal office for each company is located in Buchanan, New York.

Entergy Nuclear Operations, Inc., a Delaware corporation, is an indirect wholly owned subsidiary of Entergy Corporation, and a direct wholly owned subsidiary of Entergy Holding Company #2. The principal place of business is located in White Plains, New York.

Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC, and Entergy Nuclear Operations, Inc., are not owned, controlled, or dominated by any alien, foreign corporation, or foreign government. The applicants make this application on their own behalf and are not acting as an agent or representative of any other person.

Entergy Nuclear Indian Point 2, LLC, and Entergy Nuclear Indian Point 3, LLC, have no board of directors. They are governed by a management committee comprising Gary J. Taylor only.

The names and addresses of the principal officers of Entergy Nuclear Indian Point 2, LLC, and Entergy Nuclear Indian Point 3, LLC, are as follows.

| | |
|---|---|
| Mike Kansler<br>President and Chief Executive Officer -<br>Entergy Nuclear Operations | Entergy Nuclear Operations, Inc.<br>440 Hamilton Avenue<br>White Plains, New York 10601 |
| Leo P. Denault<br>Executive Vice President and Chief Financial Officer | Entergy Corporation<br>639 Loyola Avenue<br>New Orleans, Louisiana 70113 |
| Steven C. McNeal<br>Vice President and Treasurer | Entergy Corporation<br>639 Loyola Avenue<br>New Orleans, Louisiana 70113 |
| Robert D. Sloan<br>Executive Vice President, General Counsel and Secretary | Entergy Corporation<br>639 Loyola Avenue<br>New Orleans, Louisiana 70113 |

| | |
|---|---|
| John T. Herron<br>Sr. Vice President -<br>Entergy Nuclear Operations | Entergy Nuclear Operations, Inc.<br>440 Hamilton Avenue<br>White Plains, New York 10601 |

The names and addresses of the Directors of Entergy Nuclear Operations, Inc., are as follows.

| | |
|---|---|
| Mike Kansler<br>President and Chief Executive Officer -<br>Entergy Nuclear Operations, Inc. | Entergy Nuclear Operations, Inc.<br>440 Hamilton Avenue<br>White Plains, New York 10601 |
| Leo P. Denault<br>Executive Vice President and Chief Financial Officer | Entergy Corporation<br>639 Loyola Avenue<br>New Orleans, Louisiana 70113 |

The names and addresses of the principal Officers of Entergy Nuclear Operations, Inc., are as follows.

| | |
|---|---|
| Mike Kansler<br>President and Chief Executive Officer -<br>Entergy Nuclear Operations | Entergy Nuclear Operations, Inc.<br>440 Hamilton Avenue<br>White Plains, New York 10601 |
| Leo P. Denault<br>Executive Vice President and Chief Financial Officer | Entergy Corporation<br>639 Loyola Avenue<br>New Orleans, Louisiana 70113 |
| Steven C. McNeal<br>Vice President and Treasurer | Entergy Corporation<br>639 Loyola Avenue<br>New Orleans, Louisiana 70113 |
| John T. Herron<br>Sr. Vice President -<br>Entergy Nuclear Operations | Entergy Nuclear Operations, Inc.<br>440 Hamilton Avenue<br>White Plains, New York 10601 |
| Michael A. Balduzzi<br>Sr. Vice President - Regional Operations - Northeast | Entergy Nuclear Operations, Inc.<br>440 Hamilton Avenue<br>White Plains, New York 10601 |
| Oscar Limpias<br>Vice President, Engineering – Northeast | Entergy Nuclear Operations, Inc.<br>440 Hamilton Avenue<br>White Plains, New York 10601 |

| | |
|---|---|
| C. Randy Hutchinson<br>Sr. Vice President,<br>Business Development | Entergy Nuclear, Inc.<br>1340 Echelon Parkway<br>Jackson, Mississippi 39213 |
| Robert D. Sloan<br>Executive Vice President,<br>General Counsel and Secretary | Entergy Corporation<br>639 Loyola Avenue<br>New Orleans, Louisiana 70113 |
| Kevin Bronsoni<br>Vice President –<br>Pilgrim Nuclear Power Station | Pilgrim Nuclear Power Station<br>600 Rocky Hill Road<br>Plymouth, Massachusetts 02360 |
| Fred R. Dacimo<br>Vice President –<br>Indian Point Energy Center | Indian Point Energy Center<br>450 Broadway<br>P.O. Box 249<br>Buchanan, New York 10511 |
| Stewart Minahan<br>Vice President –<br>Cooper Nuclear Station | Cooper Nuclear Power Station<br>1200 Prospect Road<br>P.O. Box 98<br>Brownville, Nebraska 68321 |
| Peter T. Dietrich<br>Vice President –<br>FitzPatrick Nuclear Power Station | FitzPatrick Nuclear Power Station<br>268 Lake Road East<br>Lycoming, New York 13093 |
| Theodore A. Sullivan<br>Vice President –<br>Vermont Yankee Nuclear Power Station | Entergy Nuclear Vermont Yankee<br>320 Governor Hunt Road<br>Vernon, Vermont 05354 |

### 1.1.5 Class and Period of License Sought

The applicants request renewal of the facility operating licenses for Unit 2 and Unit 3 (DPR-26 and DPR-64, respectively) for a period of 20 years. The licenses were issued under Section 104b of the Atomic Energy Act of 1954 as amended. License renewal would extend the facility operating license for Unit 2 from midnight September 28, 2013, to midnight September 28, 2033, and the facility operating license for Unit 3 from midnight December 12, 2015, to midnight December 12, 2035.

This application also applies to renewal of those NRC source materials, special nuclear material, and by-product material licenses that are subsumed or combined with the facility operating licenses or provisional operating license.

### 1.1.6 Alteration Schedule

The applicants do not propose to construct or alter any production or utilization facility in connection with this renewal application.

### 1.1.7 Regulatory Agencies with Jurisdiction

Regulatory agencies with jurisdiction over the station are listed below.

Federal Energy Regulatory Commission
888 First St. N. E.
Washington, DC 20426

Securities and Exchange Commission
450 Fifth Street NW
Washington, DC 20549

The renewal of the IPEC licenses will be reviewed by the New York Public Service Commission. The address of this state commission is as follows.

New York Public Service Commission
Empire State Plaza
Agency Building 3
Albany, New York 12223

### 1.1.8 Local News Publications

The trade and news publications which circulate in the area surrounding IPEC, and which are considered appropriate to give reasonable notice of the renewal application to those municipalities, private utilities, public bodies, and cooperatives that might have a potential interest in the facility, include the following.

*White Plains Times*
31 Mamaroneck Avenue
White Plains, New York 10601

*The Journal News*
One Gannett Drive
White Plains, New York 10604

### 1.1.9 Conforming Changes to Standard Indemnity Agreement

10 CFR 54.19(b) requires that license renewal applications include, “conforming changes to the standard indemnity agreement, 10 CFR 140.92, Appendix B, to account for the expiration term of the proposed renewal license.” The current indemnity agreement (No. B-19) for IPEC states in Article VII that the agreement shall terminate at the time of expiration of the license specified in

Item 3 of the Attachment to the agreement, which is the last to expire. Item 3 of the Attachment to the indemnity agreement, as revised by Amendment No. 25, lists IPEC operating license numbers DPR-26 and DPR-64. The applicants request that conforming changes be made to Article VII of the indemnity agreement, and Item 3 of the Attachment to that agreement, specifying the extension of agreement until the expiration date of the renewed IPEC facility operating license sought in this application. In addition, should the license number be changed upon issuance of the renewal license, the applicants request that conforming changes be made to Item 3 of the Attachment, and other sections of the indemnity agreement as appropriate.

### 1.1.10 Restricted Data Agreement

This application does not contain restricted data or national security information, and the applicants do not expect that any activity under the renewed licenses for IPEC will involve such information. However, if such information were to become involved, the applicants agree that it will appropriately safeguard such information and not permit any individual to have access to, or any facility to possess, such information until the individual or facility has been approved under the provisions of Parts 10 CFR 25 or 10 CFR 95, respectively.

## 1.2 PLANT DESCRIPTION

Indian Point Energy Center Units 2 and 3 are located on approximately 239 acres of land on the east bank of the Hudson River at Indian Point, Village of Buchanan in upper Westchester County, New York. The site is about 24 miles north of the New York City boundary line. The nearest city is Peekskill, 2.5 miles northeast of Indian Point. Both units employ a pressurized water reactor (PWR) and nuclear steam supply system (NSSS) furnished by Westinghouse Electric Corporation. The facility operating license for Unit 2 (DPR-26) expires at midnight September 28, 2013. The facility operating license for Unit 3 (DPR-64) expires at midnight December 12, 2015.

Unit 2 is currently licensed to generate 3216 MWt (core power). This thermal power level corresponds to a turbine generator output of approximately 1078 MWe. The major structures are the reactor containment building, the primary auxiliary building, the control building, the fuel storage building, the turbine building, the maintenance and operations building, and the emergency diesel generator building.

Unit 3 is currently licensed to generate 3216 MWt (core power). This thermal power level corresponds to a turbine generator output of approximately 1080 MWe. The major structures are the reactor containment building, the primary auxiliary building, the control building, the fuel storage building, the turbine building, the administration building, outage support building, the training building, the condensate polisher building, and the emergency diesel generator building.

The designs of Unit 2 and Unit 3 are similar. All functional and safety systems for Unit 3 are independent of the other units on the site, except for the following:

- the common discharge canal, outfall structure and associated instrumentation and sampling systems,
- electrical supplies and interties,

- station air intertie,
- demineralized water, condensate makeup and hydrogen interties,
- city water and fire protection interties,
- diesel fuel oil supply (dedicated service of No. 2 fuel oil) system,
- sewage treatment facility,
- auxiliary steam system intertie,
- service boiler fuel oil supply system, and
- liquid steam generator blowdown (SGBD) radwaste processing and discharge (to Indian Point 1) facilities.

Indian Point Energy Center Unit 1 (Provisional Operating License No. DPR-5) shares the site and surrounding area with Units 2 and 3. Unit 1 was permanently shut down on October 31, 1974, and has been placed in a safe storage condition (SAFSTOR) until Unit 2 is ready for decommissioning.

Although the extension of the IP1 license is not a part of this license renewal application, IP1 systems and components interface with and in some cases support the operation of IP2 and IP3. Therefore, IP1 systems and components were considered in the scoping process (see Section 2.1.1). The aging effects of Unit 1 SSCs within the scope of license renewal for IP2 and IP3 will be adequately managed so that the intended functions will be maintained consistent with the current licensing basis throughout the period of extended operation.

# 2.0 SCOPING AND SCREENING METHODOLOGY FOR IDENTIFYING STRUCTURES AND COMPONENTS SUBJECT TO AGING MANAGEMENT REVIEW AND IMPLEMENTATION RESULTS

This chapter describes the process for identification of structures and components subject to aging management review in the IPEC integrated plant assessment (IPA). For those systems, structures, and components (SSCs) within the scope of license renewal, 10 CFR 54.21(a)(1) requires the license renewal applicant to identify and list structures and components subject to aging management review. Furthermore, 10 CFR 54.21(a)(2) requires that methods used to identify these structures and components be described and justified. Technical information in this section serves to satisfy these requirements.

The scoping and screening method is described in Section 2.1. This method is implemented in accordance with NEI 95-10, *Industry Guidelines for Implementing the Requirements of 10 CFR 54 - The License Renewal Rule*, Revision 6, June 2005. The results of the assessment to identify the systems and structures within the scope of license renewal (plant level scoping) are in Section 2.2. The results of the identification of the components and structural components subject to aging management review (screening) are in Section 2.3 for mechanical systems, Section 2.4 for structures, and Section 2.5 for electrical and instrumentation and controls systems.

Table 2.0-1 gives the expanded definitions of intended functions used in this application for structures and components. The tables in the application may refer to either the intended function name or to the abbreviation.

The term “piping” in component lists may include pipe, pipe fittings (such as elbows and reducers), flow elements, orifices, and thermowells. If such components have unique tag numbers or the specific component has a function other than pressure boundary, then flow elements, orifices and thermowells are identified as a separate component type.

The term “heat exchanger (shell)” may include the bonnet/channel head and tubesheet. In cases where the bonnet/channel head and tubesheet provide a unique material and environment combination, they will be uniquely identified as a separate component type.

## Table 2.0-1
## Intended Functions: Abbreviations and Definitions

| Abbreviation | Intended Function | Definition |
|---|---|---|
| CE | Conducts electricity | Provide electrical connections to specified sections of an electrical circuit to deliver voltage, current or signals. |
| EN | Shelter or protection | Provide shelter or protection to safety-related equipment (including HELB, radiation shielding and pipe whip restraint). |
| FB | Fire barrier | Provide rated fire barrier to confine or retard a fire from spreading to or from adjacent areas of the plant. |
| FC | Flow control | Provide the control of flow rate or establish a pattern of spray. |
| FD | Flow distribution | Provide a distribution of flow. |
| FLB | Flood barrier | Provide protective barrier for internal/external flood events. |
| FLT | Filtration | Provide the removal of unwanted material. |
| HS | Heat sink | Provide heat sink during station blackout or design basis accidents (includes source of cooling water for plant shutdown). |
| HT | Heat transfer | Provide the ability to transfer heat. |
| IN | Insulation (electrical) | Insulate and support an electrical conductor. |
| INS | Insulation | Provide insulating characteristics to reduce heat transfer |
| MB | Missile barrier | Provide missile (internal or external) barrier. |
| NA | Neutron absorption | Absorb neutrons. |
| PB | Pressure boundary | Provide pressure boundary integrity such that adequate flow and pressure can be delivered. This function includes maintaining structural integrity and preventing leakage or spray for 54.4(a)(2). |
| SH | Shielding | Provide gamma and neutron shielding for the reactor pressure vessel and internal components. |
| SNS | Support for Criterion (a)(2) equipment | Provide structural or functional support to nonsafety-related equipment whose failure could impact safety-related equipment (10 CFR 54.4(a)(2)). |

## Table 2.0-1
## Intended Functions: Abbreviations and Definitions
## (Continued)

| Abbreviation | Intended Function | Definition |
|---|---|---|
| SRE | Support for Criterion (a)(3) equipment | Provide structural or functional support to equipment required to meet the Commission’s regulations for the five regulated events in 10 CFR 54.4(a)(3). |
| SSR | Support for Criterion (a)(1) equipment | Provide structural or functional support for safety-related equipment. |
| STR | Structural support | Provide structural or functional support for components. |

# 2.1 SCOPING AND SCREENING METHODOLOGY

## 2.1.1 Scoping Methodology

The license renewal rule (10 CFR 54) defines the scope of license renewal. As stated in 10 CFR 54.4(a) (Reference 2.1-1), systems, structures, and components (SSCs) are required to be included in the license renewal process if they are—

(1) Safety-related systems, structures, and components, which are those relied upon to remain functional during and following design-basis events (as defined in 10 CFR 50.49 (b)(1)) to ensure the following functions—

- (i) The integrity of the reactor coolant pressure boundary;
- (ii) The capability to shut down the reactor and maintain it in a safe shutdown condition; or
- (iii) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in § 50.34(a)(1), § 50.67(b)(2), or § 100.11 of this chapter, as applicable.

(2) All nonsafety-related systems, structures, and components whose failure could prevent satisfactory accomplishment of the functions identified in paragraphs (1)(i), (ii), or (iii) of this section.

(3) All systems, structures, and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), pressurized thermal shock (10 CFR 50.61), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

NEI 95-10, *Industry Guideline for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule* (Reference 2.1-6), provides industry guidance for determining what SSCs are in the scope of license renewal. The process used to determine the systems and structures in the scope of license renewal for Indian Point Unit 2 (IP2) and Indian Point Unit 3 (IP3) followed the recommendations of NEI 95-10.

Consistent with NEI 95-10, the scoping process developed a list of plant systems and structures and identified their intended functions. Intended functions are those functions that are the basis for including a system or structure within the scope of license renewal (as defined in 10 CFR 54.4(b)) and are identified by comparing the system or structure function with the criteria in 10 CFR 54.4(a).

The component database for IP2 and IP3 was used to develop a list of plant systems. The database provides component level information, including the system, component name and identification, quality assurance (QA) classification, location, and other relevant information. The database is in two parts, one for IP2, which includes listings for Indian Point Unit 1 (IP1) systems and components, and a second part for IP3. Although the extension of the IP1 license is not a part of this license renewal application, IP1 systems and components interface with and in some cases support the operation of IP2 and IP3. The systems and components needed to support the intended functions for IP2 and IP3 are included in the scope of this license renewal application, regardless of the unit designation of the system or component.

The IP2 and IP3 units were originally constructed, owned and operated by the Consolidated Edison Company of New York. IP2 began operation in 1973 and IP3 in 1975. With the exception of minor design differences due to new requirements for IP3, the units were essentially the same design. Shortly after the initial operating license for IP3 was issued, that unit was purchased by the Power Authority of the Sate of New York, which subsequently assumed responsibility for its operation. The two units were operated independently until Entergy purchased and assumed operations of IP2 and IP3 in 2001 and 2000 respectively. Because of the extended period of independent operations, differences developed in the design and operation of the two units. Different approaches were taken to resolve emergent licensing and design issues, resulting in further variations in the plants' designs. Some aspects of the unit operations were different, including methods for identification and documentation of systems and their boundaries. As a result, even though the plants remain largely the same, with about the same number of components per unit, there are marked differences in the number of IP2 and IP3 systems and in the boundaries for similarly named systems.

For mechanical system scoping, system boundaries were defined in part by the collection of components in the database assigned to the system code. The component database is primarily a maintenance tool used to support work request documentation. The database represents all systems and contains the vast majority of system components. The database was useful in preparing the list of plant systems, but could not be used alone to determine all system boundaries. Where necessary, flow diagrams were used with the component database to help define logical system boundaries. System functions are determined based on the functions performed by the components within those boundaries. Because of the differences in IP2 and IP3 system boundaries, the intended functions for the systems are often different, even for similarly named systems. (Structural commodities associated with mechanical systems, such as pipe hangers and insulation, are evaluated with the structural bulk commodities.)

As the starting point for structural scoping, a list of plant structures was developed from a review of plant layout drawings, maintenance rule documentation, design basis documents, and the UFSAR. The structures list includes all structures that potentially support plant operations or could adversely impact structures that support plant operations (i.e., seismic II/I). In addition to buildings and facilities, the list of structures includes other structures that support plant operation (e.g., foundations for freestanding tanks and electrical manholes).

Intended functions for structures and mechanical systems were identified based on reviews of applicable plant licensing and design documentation. Documents reviewed included maintenance rule basis documents, design basis documents, site system safety function sheets (SSFS) (see Section 2.1.1.1.1 for description of SSFS), the fire hazards analysis, the safe shutdown analysis, internal flooding analyses, Technical Specifications, applicable sections of the UFSAR, and various station drawings as necessary.

Each structure and mechanical system was evaluated against the criteria of 10 CFR 54.4 as described in the following sections. Section 2.1.1.1 discusses the evaluation against the safety-related criterion in 10 CFR 54.4(a)(1). Section 2.1.1.2 discusses the evaluation against the nonsafety-related SSCs affecting safety-related SSCs criterion, 10 CFR 54.4(a)(2). Section 2.1.1.3 discusses the evaluation against the regulated events criterion, 10 CFR 54.4(a)(3). The results of these evaluations for plant systems and structures are presented in Section 2.2.

Because the aging management review differed for mechanical and electrical equipment, the scoping of mechanical and electrical systems was treated differently. For the purposes of system level scoping, all plant electrical and instrumentation and control (I&C) systems are included in the scope of license renewal. Electrical and I&C components in mechanical systems were included in the evaluation of electrical systems. See Section 2.5 for additional information on electrical and I&C system scoping and screening.

### 2.1.1.1 Application of Safety-Related Scoping Criteria

Systems and structures that perform safety functions as defined by the functions listed in 10 CFR 54.4(a)(1) are within the scope of license renewal. Design basis events are defined in 10 CFR 50.49(b)(1) as conditions of normal operation, including anticipated operational occurrences, design basis accidents, external events, and natural phenomena for which the plant must be designed to ensure functions identified in 10 CFR 54.4(a)(1)(i) through (iii).

Component and structure quality classifications are controlled by corporate and site procedures. Together, the procedures define design basis events consistent with 10 CFR 50.49 (b)(1) and define safety-related, or quality assurance Class A (IP2) or Category I (IP3), to include safety-related SSCs that are necessary to ensure, during and following design basis events,

- the integrity of the reactor coolant pressure boundary, or
- the capability to shut down the reactor and maintain it in a safe shutdown condition, or
- the capability to prevent or mitigate the consequences of accidents that could result in potential off-site exposures comparable to the guidelines of 10 CFR 50.67 or 10 CFR 100 as applicable.

This is the same definition of safety-related SSC used in 10 CFR 54.4(a)(1). Although the IPEC definition does not mention the exposure guidelines of § 50.34(a)(1), for plants (including IPEC) with construction permits issued before January 10, 1997, § 50.34(a)(1) refers to the guidelines of 10 CFR 100, which are included in the IPEC definition. The definition used for Unit 3 does not refer to 10 CFR 50.67 regarding the alternate source term. See Section 2.1.1.1.2 for further discussion of the alternate source term for Unit 3.

Although the IP2 and IP3 definition of safety-related SSC is consistent with the definition used in 10 CFR 54.4(a)(1), the identification of safety functions for the two units was slightly different. Sections 2.1.1.1.1 and 2.1.1.1.2 describe the evaluation of the safety-related criterion in 10 CFR 54.4(a)(1) for IP2 and IP3, respectively.

#### 2.1.1.1.1 Review of Safety-Related Scoping Criteria for IP2

Entergy corporate procedures and site engineering standards control component and structure quality classification. These procedures also control the development and maintenance of the System Safety Function Sheets (SSFS) which, for other Entergy plants, including IP3, list functions performed by each system with each function classified as safety-related, augmented quality, or nonsafety-related. For IP2, the SSFS for mechanical systems were developed in conjunction with the license renewal scoping effort. The system functions were identified through reviews of IP2 design and licensing documentation. The following sources were considered.

- UFSAR
- Technical Specifications and bases
- technical requirements manual
- design basis documents
- licensing commitment database
- maintenance rule bases documents
- fire hazards analysis
- Appendix R safe shutdown analysis
- station blackout analysis
- safety evaluation reports
- docketed correspondence
- plant drawings

The IP2 functions were classified using the definition of safety-related described in Section 2.1.1.1, which is consistent with the definition in 10 CFR 54.4(a)(1). Thus the functions classified as safety-related for each system comprise the set of intended functions for the system for criterion 10 CFR 54.4(a)(1).

Systems with mechanical components that perform a mechanical safety function are included in the scope of license renewal. Systems with safety-related electrical components but no safety-related mechanical components are not included in scope for this criterion; however, the electrical portions of the system are included in scope by default (see Section 2.5).

Structural safety functions include providing containment or isolation to mitigate post-accident off-site doses and providing support or protection to safety-related equipment. The structural safety functions are identified in the UFSAR, the maintenance rule structural monitoring program, the Fire Hazards Analysis, design basis documents, and structural drawings. Structures with a safety function or that support or protect a safety-related component are included in the scope of license renewal on the basis of criterion 10 CFR 54.4(a)(1). Structures and structural components that provide protection to safety-related equipment from design basis events, including external events and natural phenomena, are included in the scope of license renewal on the basis of criterion 10 CFR 54.4(a)(1).

#### 2.1.1.1.2 Review of Safety-Related Scoping Criteria for IP3

Entergy corporate procedures and site engineering standards control component and structure quality classification. The component database maintains the controlled component level list of quality classifications. Procedures also control the development and maintenance of the SSFS, which list functions performed by each system with each function classified as safety-related, augmented quality, or nonsafety-related.

The definition of safety-related used to classify IP3 safety functions presented in the SSFS encompasses and is conservative to the definition of safety-related described in Section 2.1.1.1 with one exception: the IP3 definition does not refer to the exposure guidelines referred to in § 50.67(b)(2) addressing the alternate source term. Although the IP3 definition of safety-related does not refer to § 50.67(b)(2), IP3 has credited the alternate source term in the dose analyses. A review was performed of the systems and components that are credited in the analyses to ensure the applicable systems and components were included in the scope of the license renewal. No new SSC functional requirements, beyond those established to meet the guidelines of 10 CFR 100, were credited for the application of the alternate source term, so no additional SSCs were included in the scope of license renewal.

For license renewal scoping, mechanical system-level functions were obtained from the SSFS. Additional information on system functions was obtained from the UFSAR, the maintenance rule SSC basis documents for each system, piping flow diagrams and from design basis documents for those systems for which a DBD was written. Safety objectives are included in the UFSAR system descriptions, but these are not always safety functions as defined by 10 CFR 54.4(a)(1).

Systems with mechanical components that perform a mechanical safety function are included in the scope of license renewal. Systems with safety-related electrical components but no safety-related mechanical components are not included in scope for this criterion; however, the electrical portions of the system are included in scope by default (see Section 2.5).

Structural safety functions include providing containment or isolation to mitigate post-accident off-site doses and providing support or protection to safety-related equipment. The structural safety functions are identified in the UFSAR, the maintenance rule basis documents for structures, the Fire Hazards Analysis, design basis documents, and structural drawings. Structures with a safety function or that support or protect a safety-related component are included in the scope of license renewal on the basis of criterion 10 CFR 54.4(a)(1). Structures and structural components that provide protection to safety-related equipment from design basis events, including external events and natural phenomena, are included in the scope of license renewal on the basis of criterion 10 CFR 54.4(a)(1).

### 2.1.1.2 Application of Criterion for Nonsafety-Related SSCs Whose Failure Could Prevent the Accomplishment of Safety Functions

This review identified nonsafety-related systems, structures, and components whose failure could prevent satisfactory accomplishment of a safety function. The method used was based on guidance provided in Appendix F of NEI 95-10 (Reference 2.1-6). Consideration of hypothetical failures that could result from system interdependencies that are not part of the current licensing basis and that have not been previously experienced is not required.

The impacts of nonsafety-related SSC failures were considered as either functional or physical. A functional failure is one where the failure of a nonsafety-related SSC to perform its normal function impacts a safety function. A physical failure is one where a safety function is impacted by the loss of structural or mechanical integrity of an SSC in physical proximity to a component that supports a safety function.

#### 2.1.1.2.1 Functional Failures of Nonsafety-Related SSCs

At IPEC, SSCs required to perform a function in support of safety-related components are generally classified as safety-related and included in the scope of license renewal per Section 2.1.1.1. For the few exceptions where nonsafety-related components are required to remain functional to support a safety function, this system intended function is identified in Section 2.3 and the components are included in the appropriate aging management review. [1]

#### 2.1.1.2.2 Physical Failures of Nonsafety-Related SSCs

Based on the license renewal rule and the guidance in NEI 95-10 (Reference 2.1-6), physical failures of nonsafety-related SSCs in scope based on 10 CFR 54.4(a)(2) fit into the following categories:

- nonsafety-related SSCs directly connected to safety-related SSCs (typically piping and HVAC ductwork); or

---

[1] These systems include component cooling water, city water and gas turbine fuel oil supply for IP2 (all three support engineered safety features); city water and fire protection for IP2 (support spent fuel pool makeup); and city water makeup and fire water for IP3 (support spent fuel pool make-up).

- nonsafety-related SSCs with the potential for spatial interaction with safety-related components that could prevent accomplishment of a safety function.

### (1) *Nonsafety-Related SSCs Directly Connected to Safety-Related SSCs*

Certain components and piping outside the safety class pressure boundary must be structurally sound in order to maintain the pressure boundary integrity of safety class piping. In this case, the scope of license renewal includes the nonsafety-related piping and supports up to and including the first seismic anchor beyond the safety/nonsafety interface such that the safety-related portion of the piping will be able to perform its intended function. For piping in this structural boundary, pressure integrity is not required; however, piping within the safety class pressure boundary depends on the structural boundary piping and supports in order for the system to fulfill its safety function. For IPEC, "structural boundary" is defined as the portion of a piping system outside the safety class pressure boundary yet relied upon to provide structural support for the pressure boundary.

### (2) *Nonsafety-Related Systems or Components with the Potential for Spatial Interaction with Safety-Related Components that Could Prevent Accomplishment of a Safety Function*

The following sections address the different modes of spatial interaction that were considered. Interactions can occur in the following forms:

- physical impact (e.g., seismic Class II/I) or flooding,
- pipe whip, jet impingement, or harsh environment resulting from a piping rupture, or
- damage due to leakage or spray from nonsafety-related SSCs.

The approach employed for IPEC is consistent with NEI 95-10, Appendix F (Reference 2.1-6). Protective features (whip restraints, spray shields, supports, missile or flood barriers, etc.) are installed to protect safety-related SSCs against spatial interaction with nonsafety-related SSCs. Such protective features credited in the plant design are included within the scope of license renewal and are subject to aging management review. Protective features are typically associated with a structure and are addressed in the civil/structural section of this application.

#### *Physical Impact (Seismic II/I, Missiles, or Flooding)*

Consistent with NEI 95-10, Appendix F, nonsafety-related supports for non-seismic or Seismic II/I piping systems and electrical conduit and cable trays with a potential for spatial interaction with safety-related SSCs are subject to aging management review based on the criterion of 10 CFR 54.4(a)(2). These supports and components are addressed in a commodity fashion within the civil/structural section.

Missiles can be generated from internal or external events such as failure of rotating equipment. Inherent nonsafety-related features that protect safety-related equipment from missiles require aging management review based on the criterion of 10 CFR 54.4(a)(2).

Overhead-handling systems whose structural failure could result in damage to any system that could prevent the accomplishment of a safety function meet the criteria of 10 CFR 54.4(a)(2) and are within the scope of license renewal.

Walls, curbs, dikes, doors, etc., that provide flood barriers to safety-related SSCs are within the scope of license renewal based on the criterion of 10 CFR 54.4(a)(2).

*Pipe Whip, Jet Impingement, or Harsh Environments*

Nonsafety-related portions of high-energy lines were evaluated against the criterion of 10 CFR 54.4(a)(2). Documents reviewed included the UFSAR and other relevant site documentation, including the design basis documents. IPEC high-energy systems were evaluated to ensure identification of components that are part of nonsafety-related high-energy lines that can affect safety-related equipment.

If a high-energy line break (HELB) analysis assumes that a nonsafety-related piping system does not fail or assumes failure only at specific locations, then that piping system is within the scope of license renewal per 10 CFR 54.4(a)(2) and subject to aging management review in order to provide reasonable assurance that those assumptions remain valid through the period of extended operation.

*Spray or Leakage*

Moderate and low energy systems have the potential for spatial interactions of spray and leakage. Nonsafety-related systems and nonsafety-related portions of safety-related systems with the potential for spray or leakage that could prevent satisfactory accomplishment of a safety function are in the scope of license renewal and subject to aging management review.

Components that do not contain liquids cannot adversely affect safety-related SSCs due to leakage or spray. Operating experience indicates that nonsafety-related components containing only air or gas have experienced no failures due to aging that could impact the ability of safety-related equipment to perform required safety functions. There are no aging effects for these components when the environment is a dry gas. A system containing only air or gas is not in the scope of license renewal based on the potential for spray or leakage.

The review utilized a spaces approach for scoping of nonsafety-related systems with potential for spatial interaction that could affect a safety function. The spaces approach focuses on the interaction between components with nonsafety functions and components with safety functions that are located in the same space. A "space" is defined as a room or cubicle that is separated from other spaces by substantial objects (such as wall, floors, and ceilings). The space is defined such that any potential interaction is limited to the space.

Nonsafety-related systems that contain water, oil, or steam with components located inside structures containing equipment with a safety function are potentially in scope for possible spatial interaction under criterion 10 CFR 54.4(a)(2). These systems were evaluated further to determine if system components were located in a space such that equipment with a safety function could be affected by a component failure.

### 2.1.1.3 Application of Criterion for Regulated Events

The scope of license renewal includes those systems, structures, and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), pressurized thermal shock (10 CFR 50.61), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63). This section discusses the approach used to identify the systems and structures in the scope of license renewal based on this criterion. The systems and structures that perform intended functions in support of these regulated events are identified in the descriptions in Sections 2.3, 2.4, and 2.5.

#### 2.1.1.3.1 Commission's Regulations for Fire Protection (10 CFR 50.48)

Systems and structures in the scope of license renewal for fire protection include equipment based on functional requirements defined in 10 CFR 50.48. SSCs credited with fire prevention, detection and mitigation in areas containing equipment important to safe operation of the plant are in scope as is equipment credited to achieve safe shutdown in the event of a fire. To identify this equipment, a detailed review of the IPEC current licensing basis for fire protection was performed and the systems and structures relied upon for compliance with the Commission’s regulations were identified.

#### 2.1.1.3.2 Commission's Regulations for Environmental Qualification (10 CFR 50.49)

10 CFR 50.49 defines electric equipment important to safety that is required to be environmentally qualified to mitigate certain accidents that result in harsh environmental conditions in the plant. 10 CFR 50.49 codified requirements for the environmental qualification of electrical equipment that had been presented in other regulatory documents such as Bulletin 79-01B. The IPEC equipment qualification program satisfies these requirements.

As described in Section 2.1.1 of this application, a bounding scoping approach is used for electrical equipment. Electrical systems and electrical equipment in mechanical systems are by default included in scope for license renewal. Consequently, the environmentally qualified equipment is in scope for license renewal.

#### 2.1.1.3.3 Commission's Regulations for Pressurized Thermal Shock (10 CFR 50.61)

The PTS rule, 10 CFR 50.61, “Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events,” requires that licensees of pressurized water reactors evaluate the reactor vessel beltline materials against specific criteria to ensure protection from brittle fracture. The PTS rule specifies the calculational method to determine an analytical value, $RT_{PTS}$, which is compared to PTS screening criteria specified in the rule.

For IP2, the limiting reference temperature after 60 years of operation is below the screening criteria. As a result, no flux reduction programs or modifications to equipment, systems or operation are necessary to prevent potential failure of the reactor vessel.

For IP3, projected reference temperature values after 60 years of operation are below the screening criteria with the exception of one plate. At present, it is estimated that plate B2803-3 will reach the screening criterion approximately nine years after entering the period of extended operation. IP3 has already implemented flux reduction measures for this region of the beltline, and a plant-specific safety analysis for plate B2803-3 will be submitted to the NRC three years prior to reaching the $RT_{PTS}$ screening criterion. Modifications to equipment, systems or operation are not currently necessary and none have been implemented. (See Section 4.2.2 for further discussion.)

For both IP2 and IP3, the only systems currently relied upon to meet the PTS regulation is the reactor coolant system, which contains the reactor vessel. There are no structures relied upon to meet the PTS regulation.

#### 2.1.1.3.4 Commission's Regulations for Anticipated Transients without Scram (10 CFR 50.62)

An anticipated transient without scram (ATWS) is an anticipated operational occurrence that is accompanied by a failure of the reactor trip system to shut down the reactor. The ATWS rule, 10 CFR 50.62, requires specific improvements in the design and operation of commercial nuclear power facilities to reduce the probability of failure to shut down the reactor following anticipated transients and to mitigate the consequences of an ATWS event.

Based on the current licensing bases for ATWS for Unit 2 and Unit 3, mechanical system intended functions supporting ATWS requirements were determined. As described in Section 2.1.1, a bounding scoping approach is used for electrical equipment. Electrical and instrumentation and control (EIC) systems and electrical equipment in mechanical systems are by default included in scope for license renewal. Consequently, EIC equipment that supports compliance with the ATWS rule is in scope for license renewal.

#### 2.1.1.3.5 Commission's Regulations for Station Blackout (10 CFR 50.63)

10 CFR 50.63, "Loss of All Alternating Current Power," requires that each light-water-cooled nuclear power plant be able to withstand and recover from a station blackout (SBO). As defined by 10 CFR 50.2, a station blackout is the loss of offsite and onsite emergency AC electric power to the essential and non-essential switchgear buses in a nuclear power plant. It does not include the loss of AC power fed from inverters powered by station batteries or by alternate AC sources, nor does it assume a concurrent single failure or design basis accident. The objective of this requirement is to assure that nuclear power plants are capable of withstanding an SBO and maintaining adequate reactor core cooling and appropriate containment integrity for a required duration.

Both IP2 and IP3 have alternate AC power sources that can be available within one hour. Coping analyses have demonstrated sufficient capacity and capability to ensure that the core is cooled and appropriate containment integrity is maintained for the coping duration of eight hours. Based on the current licensing bases for SBO, Entergy determined the system intended functions performed in support of 10 CFR 50.63 requirements.

Upon completion of its installation and testing, a new diesel generator, the SBO/Appendix R diesel generator (SBO/ARDG), will be the source of alternate AC power credited for IP2 compliance with 10 CFR 50.63. The SBO/ARDG will be the source of alternate AC power continuing through the period of extended operation. The SBO/ARDG will be installed and operational prior to completion of NRC review of this application. The SBO/ARDG will replace the gas turbines to provide power for Appendix R and station blackout events. The integrated plant assessment for license renewal includes review of the SBO/ARDG. Specifically, the results of that review are included in Section 2.3.3.16 for scoping and screening, and in Table 3.3.2-16-IP2 for the aging management review.

Based on NRC guidance in NUREG-1800 Section 2.5.2.1.1, certain switchyard components required to restore offsite power are conservatively included within the scope of license renewal even though those components are not relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for station blackout (10 CFR 50.63).

As described in Section 2.1.1, a bounding approach to scoping is used for electrical equipment. On-site electrical systems and electrical equipment in mechanical systems are by default included in scope for license renewal. Consequently, electrical equipment that supports the requirements of 10 CFR 50.63 is included in the scope of license renewal.

### 2.1.2 Screening Methodology

Screening is the process for determining which components and structural elements require aging management review. Screening is governed by 10 CFR 54.21(a), which reads as follows.

> (1) For those systems, structures, and components within the scope of this part, as delineated in § 54.4, identify and list those structures and components subject to an aging management review. Structures and components subject to an aging management review shall encompass those structures and components—
>
> (i) That perform an intended function, as described in § 54.4, without moving parts or without a change in configuration or properties. These structures and components include, but are not limited to, the reactor vessel, the reactor coolant system pressure boundary, steam generators, the pressurizer, piping, pump casings, valve bodies, the core shroud, component supports, pressure retaining boundaries, heat exchangers, ventilation ducts, the containment, the containment liner, electrical and mechanical penetrations, equipment hatches, seismic Category I structures, electrical cables and connections, cable trays, and electrical cabinets, excluding, but not limited to, pumps (except casing), valves (except body), motors, diesel generators, air compressors, snubbers, the control rod drive, ventilation dampers, pressure transmitters, pressure indicators, water level indicators, switchgears, cooling fans, transistors, batteries, breakers, relays, switches, power inverters, circuit boards, battery chargers, and power supplies; and
>
> (ii) That are not subject to replacement based on a qualified life or specified time period.
>
> (2) Describe and justify the methods used in paragraph (a)(1) of this section [10 CFR 54.21].
>
> (3) For each structure and component identified in paragraph (a)(1) of this section [10 CFR 54.21], demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB [current licensing basis] for the period of extended operation.

NEI 95-10 (Reference 2.1-6) provides industry guidance for screening structures and components to identify the passive, long-lived structures and components that support an intended function. The screening process for IPEC followed the recommendations of NEI 95-10.

Within the group of systems and structures that are in scope, passive long-lived components or structural elements that perform intended functions require aging management review. Components or structural elements that are either active or subject to replacement based on a qualified life do not require aging management review.

Although the requirements for the integrated plant assessment are the same for each system and structure, in practice the screening process differed for mechanical systems, electrical systems, and structures. The three separate screening processes are described below.

### 2.1.2.1 Screening of Mechanical Systems

For each mechanical system within the scope of license renewal, the screening process identified those components that are subject to aging management review. Section 2.3 presents the results for mechanical systems.

#### 2.1.2.1.1 Identifying Components Subject to Aging Management Review

Within the system, long-lived components that perform or support an intended function without moving parts or a change in configuration or properties (passive) are subject to aging management review.

In making the determination that a component is passive, it is not necessary to consider the piece parts of the component. However, in the case of valves, pumps, and housings for fans and dampers, an intended function of maintaining the pressure boundary is performed by the valve bodies, pump casings, and housings, and therefore these are subject to aging management review.

If the component is not subject to replacement based on qualified life or specified time period, then it is considered long-lived. Replacement programs are based on vendor recommendations, plant experience, or any means that establishes a specific service life, qualified life, or replacement frequency under a controlled program. Components that are subject to replacement based on qualified life or specified time period (i.e., not long-lived) are not subject to aging management review. Where flexible elastomer hoses/expansion joints are periodically replaced, these components are not long-lived and therefore not subject to aging management review.

Certain safety-related instrument air solenoid valves open to relieve pressure and fail to a safe position upon loss of pressure boundary. Aging management review is not required for these valves because maintaining a pressure boundary is not a component intended function.

#### 2.1.2.1.2 Identifying Components Subject to Aging Management Review Based on Support of an Intended Function for 10 CFR 54.4(a)(2)

As discussed in Section 2.1.1.2, systems within the scope of license renewal based on the criterion of 10 CFR 54.4(a)(2) interact with safety-related systems in one of two ways: functional or physical. A functional failure is one where the failure of a nonsafety-related SSC to perform its function impacts a safety function. A physical failure is one where a safety function is impacted by the loss of structural or mechanical integrity of an SSC in physical proximity to components supporting the safety function.

As discussed in Section 2.1.1.2, physical failures of nonsafety-related systems in scope based on 10 CFR 54.4(a)(2) fit into the following two categories:

- nonsafety-related systems or components directly connected to safety-related systems (typically piping systems); or
- nonsafety-related SSCs with the potential for spatial interaction with safety-related components that could prevent accomplishment of a safety function.

For systems that were identified as not being in scope for spatial effects, LRA drawings were reviewed to identify any nonsafety-related directly connected to safety-related interfaces. In most cases, piping substantial enough that it could provide structural support was traced back to the nearest point that could conservatively be considered an end point, such as a base-mounted component, flexible connection, or end of a piping run (such as a drain line). The use of this bounding approach is acceptable using the bases provided in Appendix F of NEI 95-10 (Reference 2.1-6). All components required or conservatively considered to provide structural support for safety-related portions of systems are subject to aging management review.

The following modes of spatial interaction are described in Section 2.1.1.2.

*Physical Impact or Flooding*

The evaluation of physical interactions due to physical impact (Seismic II/I, missiles, or flooding) affects only structures and structural components. This includes overhead-handling systems whose failure could result in damage to a system that could prevent the accomplishment of a safety function as well as walls, curbs, dikes, doors, etc., that provide flood barriers to safety-related equipment. Structures and structural components are reviewed in Section 2.4.

*Pipe Whip, Jet Impingement, or Harsh Environments*

In order to ensure the nonsafety-related portions of high-energy lines were included in this 54.4(a)(2) review, the IPEC UFSAR and associated site documentation was reviewed.

Many of the IP2 and IP3 high energy lines meet the 10 CFR 54.4(a)(1) or 10 CFR 54.4(a)(3) scoping criteria and are therefore evaluated in the individual system mechanical aging management reviews. The conservative scoping criteria for 10 CFR 54.4(a)(2) includes all fluid-filled high-energy lines that are not included in other AMRs with the potential to affect components that have a safety function. Components in such high-energy lines are subject to aging management review and are included in the appropriate system table in Section 2.3.3.19.

*Leakage or Spray*

For nonsafety-related systems with the potential for spatial interaction that could affect a safety function, a spaces approach was used to identify components subject to aging management review. Components containing oil, steam or liquid and located in spaces containing equipment with a safety function are subject to aging management review.

#### 2.1.2.1.3 Mechanical System Drawings

License renewal drawings were prepared to indicate portions of systems that support system intended functions (with the exception of those systems in scope for 10 CFR 54.4(a)(2) for physical interactions). In addition, the drawings identify components that are subject to aging management review. Boundary flags are used in conjunction with safety-to-nonsafety class breaks to identify the system intended function boundaries. Boundary flags are noted on the drawings as system intended function boundaries. Components within these boundary flags and class breaks support the system intended functions (those functions that required the system to be in scope). Components subject to aging management review (i.e., passive, long-lived components that support system intended functions) are highlighted using color coding to indicate which system aging management review evaluated the components. Drawings that contain only highlighting (no boundary flags) indicate that all components on the drawing support system intended functions unless excluded by safety-to-nonsafety class breaks.

Flexible elastomer hoses/expansion joints that are periodically replaced (not long-lived) and therefore not subject to aging management review are indicated as such on the drawings. Safety-related instrument air solenoid valves that open to relieve pressure and fail to a safe position upon loss of pressure boundary do not require aging management review but do support a system intended function. To maintain the legibility of the drawings, these components are not marked individually on the drawing using boundary flags.

Components that are subject to aging management review based only on the criterion of 10 CFR 54.4(a)(2) for physical interactions are not indicated on license renewal drawings. The determination of whether a component meets the 10 CFR 54.4(a)(2) scoping criterion is based on the location of the component in relation to structural/seismic boundaries and in relation to equipment that performs a safety function (function identified in 10 CFR 54.4 (a)(1)). Providing drawings highlighting in-scope (a)(2) components would not provide significant additional information since the drawings do not indicate proximity of components to equipment performing safety functions and do not identify structural/seismic boundaries. For further information on scoping based on 10 CFR 54.4(a)(2), see Section 2.1.1.2.

### 2.1.2.2 Screening of Structures

For each structure within the scope of license renewal, the structural components and commodities were evaluated to determine those subject to aging management review. This evaluation (screening process) for structural components and commodities involved a review of design basis documents, design drawings, general arrangement drawings, penetration drawings, the UFSAR, plant modifications, system descriptions, and plant walkdowns to identify specific structural components and commodities that make up the structure. Structural components and commodities subject to aging management review are those that perform an intended function without moving parts or a change in configuration or properties (i.e., passive), and are not subject to replacement based on qualified life or specified time period (i.e., long-lived). Since structures are inherently passive, and with few exceptions are long-lived, the screening of structural components and commodities was based primarily on whether they perform an intended function.

#### 2.1.2.2.1 Structural Component and Commodity Groups

Structural components and commodities often have no unique identifiers such as those given to mechanical components. Therefore, grouping structural components and commodities based on materials of construction provided a practical means of categorizing them for aging management reviews. Structural components and commodities were categorized by the following groups based on materials of construction.

- steel
- bolted connections
- concrete
- other materials

#### 2.1.2.2.2 Evaluation Boundaries

Structural components and commodities that are attached to a structure or reside within a structure are generally categorized as either component supports or other structural members.

*ASME and Non-ASME Component Supports – Mechanical Components*

The evaluation boundaries for mechanical component supports were established in accordance with rules governing inspection of component supports (i.e., ASME Section XI, Subsection IWF). Component support examination boundaries for integral and non-integral (i.e., mechanically attached) supports are defined in article IWF-1300, Figure IWF-1300-1. In general, the support boundary extends to the surface of the building structure, but does not include the building structure.  Furthermore, the support boundary extends to include non-integral attachments to piping and equipment, but does not include integral attachments to the same.

*Component Supports – Electrical Components*

Supports for electrical components include cable trays and conduit supports, electrical panels, racks, cabinets and other enclosures.  The evaluation boundary for these items includes supporting elements, including integral attachments to the building structure.

*Other Structural Members*

Evaluation boundaries for other structural members whose function is to carry dynamic loads caused by postulated design basis events are consistent with the method for establishing boundaries for supports specified above.  That is, the boundary includes the structural component and the associated attachment to the building structure.  The portion of the attachment embedded in the building structure is considered part of the structure.

#### 2.1.2.2.3 Intended Functions

Structural components and commodities were evaluated to determine intended functions as they relate to license renewal.  Structural component and commodity intended functions include providing shelter or protection; providing structural or functional support; and serving as barriers for fire, flood, or HELB.  NEI 95-10 (Reference 2.1-6) provides guidelines for determining the intended functions of structures, structural components and commodities.  These intended functions are included in Table 2.0-1.

### 2.1.2.3 Electrical and Instrumentation and Control Systems

#### 2.1.2.3.1 Passive Screening

NEI 95-10, Appendix B, “Typical Structure, Component and Commodity Groupings and Active/ Passive Determinations for the Integrated Plant Assessment,” identifies electrical commodities considered to be passive.  The IPEC electrical commodity groups were identified and cross-referenced to the appropriate NEI 95-10 commodity, which identified the passive commodity groups.

Two passive electrical and I&C commodity groups were identified that meet the 10 CFR 54.21(a)(1)(i) criterion (i.e., components that perform an intended function without moving parts or without a change in configuration):

- high voltage insulators, and

- cables and connections, bus, electrical portions of electrical and I&C penetration assemblies.

Other electrical and I&C commodity groups are active and do not require aging management review.

The pressure boundary function that may be associated with some electrical and I&C components identified in NEI 95-10 Appendix B (e.g., flow elements, vibration probes) was considered in the mechanical aging management reviews, as applicable. Structural commodities that support electrical components (e.g., cable trays, conduit and cable trenches) are included in the structural aging management reviews.

#### 2.1.2.3.2 Long-Lived Screening

Electrical components included in the environmental qualification (EQ) program per 10 CFR 50.49 are replaced based on qualified life and, therefore, per 10 CFR 54.21(a)(1)(ii) are not subject to aging management review. The result is that the aging management reviews involve only non-EQ electrical and I&C components.

EQ evaluations are time-limited aging analyses and are addressed in Section 4.4.

### 2.1.2.4 Consumables

Consumables include such short-lived items as packing, gaskets, component seals, O-rings, structural sealants, oil, grease, component filters, system filters, fire extinguishers, fire hoses, and air packs. Consumables have been evaluated consistently with the information presented in Table 2.1-3 of NUREG-1800. Consumables have been divided into the following four categories for the purpose of license renewal: (a) packing, gaskets, component seals, and O-rings; (b) structural sealants; (c) oil, grease, and component filters; and (d) system filters, fire extinguishers, fire hoses, and air packs.

#### 2.1.2.4.1 Packing, Gaskets, Component Seals, and O-Rings

Packing, gaskets, component mechanical seals, and O-rings are typically used to provide a leak-proof seal when components are mechanically joined together. These items are commonly found in components such as valves, pumps, heat exchangers, ventilation units or ducts, and piping segments. Based on ANSI B31.1 and the ASME B&PV Code Section III, the subcomponents of these pressure retaining components are not pressure-retaining parts. Therefore, these subcomponents are not relied on to perform a pressure boundary intended function and are not subject to aging management review.

#### 2.1.2.4.2 Structural Sealants

Elastomers and other materials used as structural sealants are subject to aging management review if they are not periodically replaced and they perform an intended function, typically supporting a pressure boundary, flood barrier, or rated fire barrier.

Seals and sealants, including pressure boundary sealants, compressible joints and seals, seismic joint filler, and waterproofing membranes are included in the aging management review of bulk commodities (Section 2.4.4). Certain sealants with a pressure boundary function are included in the aging management review of the containment buildings (Section 2.4.1).

#### 2.1.2.4.3 Oil, Grease, and Filters

Oil, grease, and component filters have been treated as consumables because either (1) they are periodically replaced or (2) they are monitored and replaced based on condition.

#### 2.1.2.4.4 System Filters, Fire Extinguishers, Fire Hoses, and Air Packs

Components such as system filters, fire hoses, fire extinguishers, self-contained breathing apparatus (SCBA), and SCBA cylinders are considered consumables and are routinely tested, inspected, and replaced when necessary. Fire protection at IPEC complies with the applicable safety standards (e.g., Branch Technical Position BTP-APCSB 9.5.1, NFPA-10 for fire extinguishers, NFPA-1962 for fire hoses, 29 CFR 1910.134 for air packs), which specify performance and condition monitoring programs for these specific components. Fire hoses and fire extinguishers are inspected and hydrostatically tested periodically and must be replaced if they do not pass the test or inspection. SCBA and SCBA cylinders are inspected and periodically tested and must be replaced if they do not pass the test or inspection. Periodic inspection procedures specify the replacement criterion of these components that are routinely checked by tests or inspections. Therefore, while these consumables are in the scope of license renewal, they are not subject to aging management review.

### 2.1.3 Interim Staff Guidance Discussion

As discussed in NEI 95-10 (Reference 2.1-6), the NRC has encouraged applicants for license renewal to address proposed ISGs in the LRA. Most past ISGs were resolved (Reference 2.1-7, Reference 2.1-8) with the issuance of Revision 1 of the license renewal guidance documents NUREG-1800 (Reference 2.1-2), NUREG-1801 (Reference 2.1-3), and RG 1.188 (Reference 2.1-4) and Revision 6 of NEI 95-10. Only the following ISGs address issues for which additional staff and industry guidance clarification may be necessary.

| | |
|---|---|
| ISG-19B | Proposed Aging Management Program XI.M11-B, "Nickel-Alloy Base-Metal Components and Welds in the Reactor Coolant Pressure Boundary," for License Renewal |

ISG-23 Replacement Parts Necessary to Meet 10 CFR 50.48 (Fire Protection)

ISG-2006-01 Corrosion of the Mark I Steel Containment Drywell Shell

ISG-2006-02 Proposed Staff Guidance on Acceptance Review for Environmental Requirements

ISG-2006-03 Staff Guidance for Preparing Severe Accident Mitigation Alternatives (SAMA) Analysis

ISG-23 was closed by the NRC staff as documented in "Summary of the License Renewal Telephone Conference Call and Meeting Held between the U.S. Nuclear Regulatory Commission Staff and the Nuclear Energy Institute License Renewal Task Force," memo dated November 22, 2006. At IPEC, a review for replacement parts necessary to meet 10 CFR 50.48 identified portable smoke ejectors and ventilation equipment credited to achieve safe shutdown during various fire scenarios for IP2 and IP3. This equipment is stored in the plant and is subject to aging management review. This equipment was included in the review of heating, ventilation and air conditioning systems in Section 2.3.3.8.

ISG 2006-01 concerns corrosion of the Mark I steel containment drywell shell. As both Unit 2 and Unit 3 are Westinghouse PWRs and therefore do not have a drywell, this ISG is not applicable.

The remaining ISGs are discussed below.

*ISG-19B* *<u>Proposed Aging Management Program XI.M11-B, "Nickel-Alloy Base-Metal Components and Welds in the Reactor Coolant Pressure Boundary," for License Renewal</u>*

The Reactor Vessel Head Penetration Inspection Program is discussed in Appendix B, Section B.1.31. The Nickel Alloy Inspection Program, as discussed in Appendix B, Section B.1.21, manages aging effects on the balance of reactor coolant pressure boundary nickel alloy components and weld materials. As this issue evolves under the existing regulatory process, the Nickel Alloy Inspection Program will be modified as appropriate in response to industry initiatives and NRC guidance and requirements.

*ISG-2006-02* *<u>Proposed Staff Guidance on Acceptance Review for Environmental Requirements</u>*

LR-ISG-2006-02 was issued in draft form by the NRC on February 8, 2007. Entergy has reviewed the draft ISG and determined that the ER has met the guidance of LR-ISG-2006-02. Environmental report preparation was in accordance with guidance of Supplement 1 to Regulatory Guide 4.2, "Preparation of Supplemental Environmental Reports for Applications to Renew Nuclear Power Plant Operating Licenses."

*ISG-2006-03* *Staff Guidance for Preparing Severe Accident Mitigation Alternatives (SAMA) Analysis*

This ISG, issued for comment by the NRC, recommends that applicants for license renewal use guidance document NEI 05-01, Rev. A when preparing SAMA analyses. The IPEC SAMA analysis provided as a part of Appendix E is consistent with the guidance of NEI 05-01 as discussed in this ISG.

### 2.1.4 Generic Safety Issues

In accordance with the guidance in NEI 95-10, review of NRC generic safety issues (GSIs) as a part of the license renewal process is required to satisfy the finding required by 10 CFR 54.29. GSIs that involve an issue related to the license renewal aging management review or time-limited aging analysis evaluations are to be addressed in the LRA. Based on NUREG-0933 (Reference 2.1-5), the following GSIs are addressed in this application.

*GSI 168* *Environmental Qualification of Electrical Equipment*

This GSI was resolved with no new requirements for licensees (Reference 2.1-9). The staff concluded the existing equipment qualification process was adequate to ensure that I&C cables would perform their intended function. Environmental qualification evaluations of electrical equipment are identified as time-limited aging analyses for IPEC and addressed in Section 4.4.

*GSI 190* *Fatigue Evaluation of Metal Components for 60-Year Plant Life*

This GSI addresses fatigue life of metal components and was closed by the NRC (Reference 2.1-10). In the closure letter, however, the NRC concluded that licensees should address the effects of reactor coolant environment on component fatigue life as aging management programs are formulated in support of license renewal. Accordingly, the issue of environmental effects on component fatigue life is addressed in Section 4.3.3.

### 2.1.5 Conclusion

The methods described in Sections 2.1.1 and 2.1.2 were used at IPEC to identify the systems, structures, and components that are within the scope of license renewal and to identify those structures and components requiring aging management review. The methods are consistent with and satisfy the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1).

### 2.1.6 References

2.1-1 10 CFR 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants."

2.1-2 U.S. Nuclear Regulatory Commission, NUREG-1800, *Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants*, September 2005.

2.1-3 U.S. Nuclear Regulatory Commission, NUREG-1801, *Generic Aging Lessons Learned (GALL) Report*, Volume 1 and Volume 2, September 2005.

2.1-4 U.S. Nuclear Regulatory Commission, Regulatory Guide 1.188, "Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses," Revision 1, September 2005.

2.1-5 U.S. Nuclear Regulatory Commission, NUREG-0933, *A Prioritization of Generic Safety Issues*, Supplement 29, November 2005.

2.1-6 Nuclear Energy Institute, NEI 95-10, *Industry Guideline on Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule*, Revision 6, June 2005.

2.1-7 Kuo, P. T. (NRC) to A. Marion (NEI) and D. Lochbaum (Union of Concerned Scientists), “Status of Interim Staff Guidance Associated with License Renewal,” letter dated May 19, 2005.

2.1-8 Kuo, P. T. (NRC) to A. Marion (NEI) and D. Lochbaum (Union of Concerned Scientists), “Staff Resolution Associated with Interim Staff Guidance ISG-07 Proposed Staff Guidance on the Scoping of Fire Protection Equipment for License Renewal,” letter dated June 7, 2005.

2.1-9 Borchardt, R., to W. Travers, “Closeout of Generic Safety Issue (GSI) 168, ‘Environmental Qualification of Low-Voltage Instrumentation and Control Cables,’” memorandum dated August 14, 2003.

2.1-10 Thadani, A., Director, Office of Nuclear Regulatory Research, to W. Travers, Executive Director of Operations, “Closeout of Generic Safety Issue 190, ‘Fatigue Evaluation of Metal Components for 60 Year Plant Life,’” NRC memorandum dated December 26, 1999.

2.1-11 U.S. Nuclear Regulatory Commission, Regulatory Guide 1.155, “Station Blackout,” August 1988.

## 2.2 PLANT LEVEL SCOPING RESULTS

Table 2.2-1a-IP2 and Table 2.2-1a-IP3 list the mechanical systems within the scope of license renewal for IPEC Unit 2 and Unit 3, respectively. Table 2.2-1b-IP2 and Table 2.2-1b-IP3 list the electrical and instrumentation and controls systems within the scope of license renewal for IPEC Unit 2 and Unit 3. Table 2.2-3 lists the structures that are within the scope of license renewal for IPEC. For mechanical systems, a reference is given to the section which describes the system. For electrical systems, no description is necessary since electrical systems are in scope by default (see Section 2.5). For structures, a reference is given to the section that includes the structure in the evaluation.

Table 2.2-2-IP2, Table 2.2-2-IP3 and Table 2.2-4 list the systems and structures that do not meet the criteria specified in 10 CFR 54.4(a) and are therefore excluded from the scope of license renewal. For each item on these lists, the table also provides a reference (if applicable) to the section of the Updated Final Safety Analysis Report (UFSAR) that describes the system or structure. For structures with no description in the UFSAR, a brief description of the building function is given. None of these structures house safety-related equipment.

The IP2 and IP3 units were originally constructed, owned and operated by the Consolidated Edison Company of New York. IP2 began operation in 1973 and IP3 in 1975. With the exception of minor design differences due to new requirements for IP3, the units were essentially the same design. Shortly after the initial operating license for IP3 was issued, that unit was purchased by the Power Authority of the Sate of New York, which subsequently assumed responsibility for its operation. The two units were operated independently until Entergy purchased and assumed operations of IP2 and IP3 in 2001 and 2000 respectively. Because of the extended period of independent operations, differences developed in the design and operation of the two units. Different approaches were taken to resolve emergent licensing and design issues, resulting in further variations in the plants' designs. Some aspects of the unit operations were different, including methods for identification and documentation of systems and their boundaries. As a result, even though the plants remain largely the same, with about the same number of components per unit, there are marked differences in the number of IP2 and IP3 systems and in the boundaries for similarly named systems.

The list of systems used in these tables and determination of system boundaries is based on the IPEC component database and flow diagrams (see Section 2.1.1). System intended functions are identified in the section referenced in Tables 2.2-1a-IP2 and 2.2-1a-IP3. Component types subject to aging management review and their intended functions are provided in tables for each system.

As needed, components are grouped functionally for the aging management review. For example, ASME Class 1 components in various systems (e.g., the residual heat removal and containment spray systems) are evaluated with the ASME Class 1 reactor coolant system in Section 3.1.2.1.3, and containment penetrations from various systems are grouped into one containment penetrations review in Section 3.2.2.1.5. For each system, see the discussion in Section 2 under "Components Subject to Aging Management Review" for further information concerning which aging management review includes components from that system.

Nonsafety-related components whose failure could prevent satisfactory accomplishment of safety functions (10 CFR 54.4(a)(2)) due to the potential for a physical interaction (see Section 2.1.1.2) are evaluated together in an (a)(2) aging management review (AMR). The (a)(2) AMR includes nonsafety-related components with the potential for a spatial interaction with a safety-related system as well as components in safety-related systems outside the safety class pressure boundary, such as piping, valves, pumps, and support elements, that are required to be structurally sound in order to maintain the integrity of safety class piping. Section 2.3.3.19 discusses systems within the scope of license renewal based on the criterion of 10 CFR 54.4(a)(2) due to the potential for a physical interaction.

Components subject to aging management review are highlighted on license renewal drawings, with the exception of components in scope for 10 CFR 54.4(a)(2) for a physical interaction with other equipment that could prevent accomplishment of a safety function. Drawings are flagged as needed to indicate system intended function boundaries. For further discussion of license renewal drawings, see Section 2.1.2.1.3.

The list of plant structures was developed from a review of plant layout drawings, maintenance rule documentation, design basis documents, and the UFSAR. Structure intended functions are identified in the section referenced in Table 2.2-3. Structural commodities associated with mechanical systems, such as pipe supports and insulation, are evaluated with the structural bulk commodities.

## Table 2.2-1a-IP2
## Mechanical Systems within the Scope of License Renewal

| System Code | Unit 2 System Name | LRA Section Describing System |
|---|---|---|
| AFW | Auxiliary Feedwater | Section 2.3.4.3, Auxiliary Feedwater |
| ARDG | SBO/Appendix R Diesel Generator | Section 2.3.3.16, Appendix R Diesel Generators |
| AS | Auxiliary Steam | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |
| CCC | Conventional Closed Cooling | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |
| CCF | Containment Cooling and Filtration | Section 2.3.3.9, Containment Cooling and Filtration |
| CCW | Component Cooling Water | Section 2.3.3.3, Component Cooling Water |
| CF | Chemical Feed | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| COND | Condensate | Section 2.3.4.6, Condensate |
| CRD | Control Rod Drive | Section 2.3.1, Reactor Coolant System |
| CSS | Containment Spray System | Section 2.3.2.2, Containment Spray System |
| CVCS | Chemical and Volume Control | Section 2.3.3.6, Chemical and Volume Control |
| CW | Circulating Water | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |
| CYW | City Water | Section 2.3.3.17, City Water |
| DOCK | Intake Structure | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| EDG | Emergency Diesel Generator | Section 2.3.3.14, Emergency Diesel Generators |
| EP | Electrical Penetrations | Section 2.3.2.5, Containment Penetrations |
| FCCH | Fuel and Core Component Handling | Section 2.3.2.5, Containment Penetrations |
| FO | Fuel Oil | Section 2.3.3.13, Fuel Oil |

## Table 2.2-1a-IP2
## Mechanical Systems within the Scope of License Renewal (Continued)

| System Code | Unit 2 System Name | LRA Section Describing System |
|---|---|---|
| FP | Fire Protection | Section 2.3.3.11, Fire Protection – Water<br>Section 2.3.3.12, Fire Protection – CO2, Halon, and RCP Oil Collection Systems |
| FW | Feedwater | Section 2.3.4.2, Main Feedwater |
| FWC | Fresh Water Cooling | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |
| GAS | Gas | Section 2.3.3.5, Nitrogen Systems |
| GEN | Main Generator | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| GT | Gas Turbine | Section 2.3.3.13, Fuel Oil |
| HR | Hydrogen Recombiners | Section 2.3.2.5, Containment Penetrations |
| HSB | House Service Boiler | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| HVAC | Heating, Ventilation and Air Conditioning | Section 2.3.3.8, Heating, Ventilation and Air Conditioning |
| IA | Instrument Air | Section 2.3.3.4, Compressed Air |
| IACC | Instrument Air Closed Cooling | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |
| ICI | In-Core Instrumentation | Section 2.3.1, Reactor Coolant System |
| IGO | Ignition Oil | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| ILWH | Integrated Liquid Waste Handling | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| IVSW | Isolation Valve Seal Water | Section 2.3.2.3, Containment Isolation Support Systems |
| LO | Lube Oil | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |
| MS | Main Steam | Section 2.3.4.1, Main Steam |

### Table 2.2-1a-IP2
### Mechanical Systems within the Scope of License Renewal (Continued)

| System Code | Unit 2 System Name | LRA Section Describing System |
|---|---|---|
| MSCL | Miscellaneous | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| NSG | Nuclear Service Grade Makeup | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| PACS | Post-Accident Containment Air Sample | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| PACV | Post-Accident Containment Vent | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| PSS | Primary Sampling | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| PW | Primary Water Makeup | Section 2.3.3.7, Primary Water Makeup |
| RCS | Reactor Coolant System | Section 2.3.1, Reactor Coolant System |
| RHR | Residual Heat Removal | Section 2.3.2.1, Residual Heat Removal |
| RMS | Radiation Monitoring | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| RW | River Water Service System | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |
| SA | Station Air | Section 2.3.3.4, Compressed Air |
| SD | Boiler Blowdown | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| SEC | Security | Section 2.3.3.15, Security Generators |
| SFPC | Spent Fuel Pool Cooling | Section 2.3.3.1, Spent Fuel Pit Cooling |
| SGBD | Steam Generator Blowdown | Section 2.3.4.4, Steam Generator Blowdown |
| SIS | Safety Injection System | Section 2.3.2.4, Safety Injection Systems |
| SSS | Secondary Sampling | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| SW | Service Water | Section 2.3.3.2, Service Water |

### Table 2.2-1a-IP2
### Mechanical Systems within the Scope of License Renewal (Continued)

| System Code | Unit 2 System Name | LRA Section Describing System |
|---|---|---|
| TSCD | Technical Support Center Diesel | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| TURB | Main Turbine | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| WCPS | Weld Channel Pressurization | Section 2.3.2.3, Containment Isolation Support Systems |
| WDS | Waste Disposal System | Section 2.3.3.18, Plant Drains |
| WTP | Water Treatment Plant | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |
| WW | Wash Water | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |

### Table 2.2-1a-IP3
### Mechanical Systems within the Scope of License Renewal

| System Code | Unit 3 System Name | LRA Section Describing System |
|---|---|---|
| AFW | Auxiliary Feedwater | Section 2.3.4.3, Auxiliary Feedwater |
| AMA | Ammonia / Morpholine Addition | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| ARDG | Appendix R Diesel Generator | Section 2.3.3.16, Appendix R Diesel Generators |
| ASC | Auxiliary Steam and Condensate Return | Section 2.3.4.1, Main Steam |
| BLCA | Boron and Layup Chemical Addition | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| BVS | Building Vent Sampling | Section 2.3.2.5, Containment Penetrations |
| CAR | Condenser Air Removal | Section 2.3.4.1, Main Steam |
| CBHV | Control Building HVAC | Section 2.3.3.8, Heating, Ventilation and Air Conditioning |

## Table 2.2-1a-IP3
## Mechanical Systems within the Scope of License Renewal (Continued)

| System Code | Unit 3 System Name | LRA Section Describing System |
|---|---|---|
| CCW | Component Cooling Water | Section 2.3.3.3, Component Cooling Water |
| CL | Chlorination | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| CO2 | Carbon Dioxide | Section 2.3.3.12, Fire Protection – CO2, Halon, and RCP Oil Collection Systems |
| COND | Condensate | Section 2.3.4.6, Condensate |
| CP | Condensate Polisher | Section 2.3.4.6, Condensate |
| CPD | Condensate Pump Discharge | Section 2.3.4.6, Condensate |
| CPS | Condensate Pump Suction | Section 2.3.4.6, Condensate |
| CRD | Control Rod Drive | Section 2.3.1, Reactor Coolant System |
| CRHV | Control Room HVAC | Section 2.3.3.10, Control Room Heating, Ventilation and Cooling |
| CS | Containment Spray | Section 2.3.2.2, Containment Spray System |
| CVCS | Chemical and Volume Control | Section 2.3.3.6, Chemical and Volume Control |
| CW | Circulating Water | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| CWM | City Water Makeup | Section 2.3.3.17, City Water |
| CXFR | Condensate Transfer | Section 2.3.4.6, Condensate |
| DW | Demineralized Water | Section 2.3.3.7, Primary Water Makeup |
| EDG | Emergency Diesel Generator | Section 2.3.3.14, Emergency Diesel Generators |
| EG | Emergency Generators | Section 2.3.3.14, Emergency Diesel Generators |
| ESS | Engineered Safeguards Initiation Logic | Section 2.3.2.4, Safety Injection Systems |
| EX | Extraction Steam | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| FBAR | Fire Barriers | Section 2.3.3.8, Heating, Ventilation and Air Conditioning |

## Table 2.2-1a-IP3
## Mechanical Systems within the Scope of License Renewal (Continued)

| System Code | Unit 3 System Name | LRA Section Describing System |
|---|---|---|
| FD | Floor Drains | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| FDA | Fire Detection and Alarms | Section 2.3.3.11, Fire Protection – Water |
| FHS | Fuel Handling System | Section 2.3.2.5, Containment Penetrations |
| FRW | Fire Water | Section 2.3.3.11, Fire Protection – Water |
| FSBHV | Fuel Storage Building HVAC | Section 2.3.3.8, Heating, Ventilation and Air Conditioning |
| FW | Feedwater | Section 2.3.4.2, Main Feedwater |
| FWP | Main Feedwater Pump & Services | Section 2.3.4.2, Main Feedwater |
| GSS | Gland Seal Steam | Section 2.3.4.1, Main Steam |
| GWD | Gaseous Waste Disposal | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| HA | Hydrazine Addition | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| HD | Heater Drain / Moisture Separator Drains/Vents | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| HPSD | High Pressure Steam Dump | Section 2.3.4.1, Main Steam |
| HVAC | Heating, Ventilation and Air Conditioning | Section 2.3.3.8, Heating, Ventilation and Air Conditioning |
| IA | Instrument Air | Section 2.3.3.4, Compressed Air |
| IACC | Instrument Air Closed Cooling | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| ILRT | Integrated Leak Rate Testing | Section 2.3.2.5, Containment Penetrations |
| INCOR | Incore Nuclear Instrumentation | Section 2.3.1, Reactor Coolant System |
| IVSW | Isolation Valve Seal Water | Section 2.3.2.3, Containment Isolation Support Systems |
| LO | Lube Oil | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |

## Table 2.2-1a-IP3
## Mechanical Systems within the Scope of License Renewal (Continued)

| System Code | Unit 3 System Name | LRA Section Describing System |
|---|---|---|
| LPSD | Low Pressure Steam Dump | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| LWD | Liquid Waste Disposal | Section 2.3.3.18, Plant Drains |
| MFW | Main Feedwater | Section 2.3.4.2, Main Feedwater |
| MS | Main Steam | Section 2.3.4.1, Main Steam |
| MTG | Main Turbine Generator | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| N2 | Nitrogen | Section 2.3.3.5, Nitrogen Systems |
| NED | Nuclear Equipment Drains | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| PAB | Primary Auxiliary Building | Section 2.3.2.3, Containment Isolation Support Systems |
| PABHV | Primary Auxiliary Building HVAC | Section 2.3.3.8, Heating, Ventilation and Air Conditioning |
| PRM | Process Radiation Monitoring | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| PS | Primary Plant Sampling | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| PV | Plant Vent | Section 2.3.3.8, Heating, Ventilation and Air Conditioning |
| PW | Primary Water Makeup | Section 2.3.3.7, Primary Water Makeup |
| PZR | Pressurizer | Section 2.3.1, Reactor Coolant System |
| RCS | Reactor Coolant System | Section 2.3.1, Reactor Coolant System |
| RHR | Residual Heat Removal | Section 2.3.2.1, Residual Heat Removal |
| RPC | Reactor Protection and Control | Section 2.3.4.1, Main Steam |
| RS | Reheat Steam | Section 2.3.4.1, Main Steam |
| RVLIS | Reactor Vessel Level Indication | Section 2.3.1, Reactor Coolant System |

## Table 2.2-1a-IP3
## Mechanical Systems within the Scope of License Renewal (Continued)

| System Code | Unit 3 System Name | LRA Section Describing System |
|---|---|---|
| RW | River Water Service | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| SA | Station Air | Section 2.3.3.4, Compressed Air |
| SECHV | Security Building HVAC | Section 2.3.3.8, Heating, Ventilation and Air Conditioning |
| SFPC | Spent Fuel Pit and Cooling | Section 2.3.3.1, Spent Fuel Pit Cooling |
| SG | Steam Generator Secondary Side Instrumentation | Section 2.3.1, Reactor Coolant System |
| SGBD | Steam Generator Blowdown | Section 2.3.4.4, Steam Generator Blowdown |
| SGBDR | Steam Generator Blowdown Recovery | Section 2.3.4.4, Steam Generator Blowdown |
| SGLC | Steam Generator Level Control | Section 2.3.1, Reactor Coolant System |
| SGS | Steam Generator Sampling | Section 2.3.4.4, Steam Generator Blowdown |
| SI | Safety Injection / Recirculation | Section 2.3.2.4, Safety Injection Systems |
| SO | Main Generator Seal Oil | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| SPG | Security Propane Generator | Section 2.3.3.15, Security Generators |
| SS | Secondary Plant Sampling | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| SWS | Service Water | Section 2.3.3.2, Service Water |
| TGHC | Turbine Generator Hydraulic Control | Section 2.3.4.1, Main Steam |
| THCC | Turbine Hall Closed Cooling | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| VCHA | Vapor Containment Hydrogen Analyzer | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| VCHVP | Vapor Containment Purge and Supply | Section 2.3.3.8, Heating, Ventilation and Air Conditioning |
| VCPR | Vapor Containment Pressure Relief | Section 2.3.3.8, Heating, Ventilation and Air Conditioning |

## Table 2.2-1a-IP3
## Mechanical Systems within the Scope of License Renewal (Continued)

| System Code | Unit 3 System Name | LRA Section Describing System |
|---|---|---|
| VCV | Vapor Containment Bldg. Ventilation | Section 2.3.3.9, Containment Cooling and Filtration |
| WCCPP | Weld Channel and Containment Penetration Pressurization | Section 2.3.2.3, Containment Isolation Support Systems |

Because of the bounding approach used for scoping electrical and I&C equipment, all electrical and I&C commodities contained in electrical and mechanical systems are in scope by default. Table 2.2-1b provides the list of electrical and I&C systems for Unit 2 and Unit 3 that do not include mechanical components that meet the scoping criteria of 10 CFR 54.4. Systems with mechanical components that meet the scoping criteria of 10 CFR 54.4 are listed in Table 2.2-1a-IP2 and Table 2.2-1a-IP3. Descriptions of each electrical system are not provided. For further information, see Section 2.5, Scoping and Screening Results: Electrical and Instrumentation and Controls Systems.

**Table 2.2-1b-IP2**
**Electrical and I&C Systems within the Scope of License Renewal**
**(Bounding Approach)**

| System Code | Unit 2 System Name | UFSAR Section |
|---|---|---|
| 118V | 118 VAC Electrical | UFSAR 8.2.2.5 |
| 120V | 120 VAC Electrical | UFSAR 8.2 |
| 13.8 | 13.8 KVAC Electrical | UFSAR 8.2.1 |
| 138K | 138 KVAC Electrical | UFSAR 8.2.1 |
| 220V | 220 VAC Electrical | None |
| 22KV | 22 KVAC Electrical | None |
| 345K | 345 KVAC Electrical | UFSAR 8.2.1 |
| 440V | 440 VAC Electrical | UFSAR 8.3 |
| 480V | 480 VAC Electrical | UFSAR 8.2.2.3 |
| 6.9K | 6.9 KVAC Electrical | UFSAR 8.2.2.2 |
| COM | Communications | UFSAR 7.7.4 |
| COMP | Computer | UFSAR 3.2.5 |
| DC | Batteries and 125V DC | UFSAR 8.2.2.4, 8.2.3.5 |
| EANS | Emergency Alert Notification | None |
| EGND | Earth Grounds | None |
| EHT | Electrical Heat Tracing | UFSAR 9.2.2.4.23, 9.2.2.5.13 |
| EML | Emergency Lighting | UFSAR 7.7.3.3.6 |
| EOFE | EOF Electrical Distribution | None |

### Table 2.2-1b-IP2
### Electrical and I&C Systems within the Scope of License Renewal (Bounding Approach) (Continued)

| System Code | Unit 2 System Name | UFSAR Section |
|---|---|---|
| EP | Electrical Penetrations | UFSAR 5.1.4.2.1, 7.2.4.1.5 |
| ESFA | Engineered Safeguards Features Actuation | UFSAR 7.2.3.2 |
| ICI | In-Core Instrumentation | UFSAR 7.6 |
| LGHT | Lighting & 110 Volt | None |
| MET | Meteorological System | IP3 UFSAR 2.6.5 |
| NIS | Nuclear Instrumentation | UFSAR 7.4 |
| OPS | Overpressurization Protection | UFSAR 7.3.3.5 |
| RMS | Radiation Monitoring | UFSAR 11.2.3 |
| RPI | Rod Position Indication | UFSAR 3B.3 |
| RPS | Reactor Protection System | UFSAR 7.2.3.1 |
| SEC | Security | None |
| SISA | Safety Injection System Actuation | UFSAR 7.2.5.1.13 |

### Table 2.2-1b-IP3
### Electrical and I&C Systems within the Scope of License Renewal (Bounding Approach)

| System Code | Unit 3 System Name | UFSAR Section |
|---|---|---|
| 120V | 120 VAC Electrical | UFSAR 8.2.2 |
| 13.8KV | 13.8 KVAC Electrical | UFSAR 8.2.1 |
| 138KV | 138 KVAC Electrical | UFSAR 8.2.1 |
| 220V | 220 VAC Electrical | None |
| 22KV | 22 KVAC Electrical | None |
| 345KV | 345 KVAC Electrical | UFSAR 8.2.1 |
| 480V | 480 VAC Electrical | UFSAR 8.2.2 |

## Table 2.2-1b-IP3
## Electrical and I&C Systems within the Scope of License Renewal (Bounding Approach) (Continued)

| System Code | Unit 3 System Name | UFSAR Section |
|---|---|---|
| 6.9KV | 6.9 KVAC Electrical | UFSAR 8.2.2 |
| AIR | Air (General) | None |
| AMSAC | ATWS Mitigating System Actuation Circuitry | UFSAR 7.2.2 |
| ARM | Area Radiation Monitoring | UFSAR 11.2.3.2 |
| CAM | Cameras | None |
| CET | Core Exit Thermocouples | UFSAR 7.6.2 |
| CFM | Critical Functions Monitoring | UFSAR 7.5.2 |
| COMM | Communications | UFSAR 9.6.5 |
| COMP | Computer | None |
| CPFHT | Condensate Polisher Facility Heat Trace | None |
| DCPWR | DC Power | UFSAR 8.2 |
| ED | Electrical Distribution | UFSAR 8.2 |
| EHT | Electrical Heat Tracing | None |
| EHT 31 | Intake Structure Heat Trace | None |
| EHT 32 | Yard Area Heat Trace | None |
| EHT 33 | Boric Acid Heat Trace | UFSAR 9.2.2 |
| EHT 34 | Nuclear Tank Heat Trace | UFSAR 9.2.2 |
| EHT 35 | Diesel Generator Heat Trace | None |
| EM | Environmental Monitoring | UFSAR 2.9 |
| EML | Emergency Lighting | UFSAR 9.6.2.6 |
| ESS | Engineered Safeguards Initiate Logic | UFSAR 7.2.2 |
| EXCOR | Excore Nuclear Instrumentation | UFSAR 7.4 |
| FDA | Fire Detection and Alarms | UFSAR 9.6.2.4 |
| FENCE | Fence Protection | None |

## Table 2.2-1b-IP3
## Electrical and I&C Systems within the Scope of License Renewal (Bounding Approach) (Continued)

| System Code | Unit 3 System Name | UFSAR Section |
|---|---|---|
| FP | Fire Protection (General) | None |
| FPHHT | Fire Pump House Heat Trace | None |
| HR | Hydrogen Recombiners | UFSAR 6.8.2 |
| HSBAHT | House Service Boiler Annex Heat Trace | None |
| IB | Instrument Bus AC Power | UFSAR 7.2.2 |
| INCOR | Incore Nuclear Instrumentation | UFSAR 7.6.2 |
| LIGHT | Lighting | None |
| MET | Meteorological System | UFSAR 2.6.5 |
| METHT | Meteorological Tower Heat Trace | None |
| MIMS | Metal Impact Monitoring | UFSAR 4.3.6 |
| NIS | Nuclear Instrumentation | UFSAR 7.4.2 |
| OPS | Overpressurization Protection | UFSAR 4.3.4 |
| PAGE | Paging | UFSAR 9.6.5 |
| PMON | Personnel Monitoring | None |
| PRM | Process Radiation Monitoring | UFSAR 11.2.3.1 |
| PVMHT | Plant Vent Monitor Heat Trace | UFSAR 11.2.3.1 |
| PZRC | Pressurizer Control | UFSAR 7.2.3 |
| QSPDS | Qualified Safety Parameter Display | UFSAR 7.5.2 |
| RDC | Rod Control | UFSAR 7.3.2 |
| RDO | Radio | UFSAR 9.6.5 |
| RM | Radiation Monitoring | UFSAR 11.2.3 |
| RPC | Reactor Protection Control | UFSAR 7.2.2 |
| RPI | Rod Position Indication | UFSAR 7.3.2 |
| RTR | Reactor Trip Relays | UFSAR 7.2.2 |

## Table 2.2-1b-IP3
## Electrical and I&C Systems within the Scope of License Renewal (Bounding Approach) (Continued)

| System Code | Unit 3 System Name | UFSAR Section |
|---|---|---|
| RVLIS | Reactor Vessel Level Indication | UFSAR 7.5.2 |
| SCC | Security Computer & Concentrators | None |
| SE | Seismic Monitoring | UFSAR 16.1.6 |
| SEC | Security (General) | None |
| SECL | Security Lighting | UFSAR 9.6.2.6 |
| SGLC | Steam Generator Level Control | UFSAR 7.2.2 |
| SPP | Sound Powered Phones | UFSAR 9.6.5 |
| SSHT | Sampling System Heat Trace | None |
| TEL | Telephones | UFSAR 9.6.5 |
| TGEC | Turbine Generator Excitation | UFSAR 10.2.2 |
| TM | Toxic Monitoring | None |
| TSI | Turbine Supervisory Instrumentation | None |
| VCHA | Vapor Containment Hydrogen Analyzer | UFSAR 6.8.2 |
| WGA | Waste Gas Analyzer | UFSAR 11.1.2.1 |

### Table 2.2-2-IP2
### Mechanical Systems Not within the Scope of License Renewal

| System Code | Unit 2 System | UFSAR Reference |
|---|---|---|
| BG | Buildings and Structures[1] | None |
| CL | Chlorination | Sections 9.6.1.2 and 10.2.4 |
| HPC | Hot Penetration Cooling | Section 5.1.4.2.2 |
| SF | Unit 1 Spent Fuel Cooling and Transfer | Unit 1 UFSAR Section 3.7.1, Supplemental Environmental Report Section 3.1.1 |

1. Besides structural components, the BG code includes a small number of mechanical components, specifically drain piping in the switchgear rooms, that do not perform an intended function.

### Table 2.2-2-IP3
### Mechanical Systems Not within the Scope of License Renewal

| System Code | Unit 3 System | UFSAR Reference |
|---|---|---|
| ABA | Administration Building Air | None |
| ABHV | Administration Building HVAC | None |
| ABW | Administration Building Waste | None |
| BAIR | Breathable Air | Section 9.10 |
| BUSFPC | Backup Spent Fuel Pool Cooling | Section 9.5.2 |
| CPA | Condensate Polisher Air | None |
| CPF | Condensate Polisher Facility | None |
| CPFHV | Condensate Polisher Facility HVAC | None |
| CPRTR | Condensate Polisher Resin Transfer Regen | Section 10.2.6 |
| CPWF | Condensate Polisher Water Factory | Section 10.2.6 |
| DI | De-Icing | None |
| H2 | Hydrogen | Sections 10.2.2 and 11.1 |

## Table 2.2-2-IP3
## Mechanical Systems Not within the Scope of License Renewal (Continued)

| System Code | Unit 3 System | UFSAR Reference |
|---|---|---|
| HAL | Halon | Section 9.6.2 |
| HPC | Hot Penetration Cooling | Section 5.1.4.2 |
| HR | Hydrogen Recombiners | Section 6.8 |
| HSB | House Service Boiler | None |
| MTDG | Met. Tower Diesel Generator | Section 2.6.5 |
| NWD | Nonradioactive Waste Disposal | None |
| OSBHV | Outage Support Building HVAC | None |
| PACV | Post-Accident Containment Vent (retired in place) | Section 5.4 |
| PCEHV | Power Conversion Equipment Building HVAC | None |
| RAMHV | RAMS Building HVAC | None |
| SDG | Sewage Diesel Generator | None |
| SWG | Site Sewage | None |
| TBHV | Turbine Building HVAC | None |
| TGEC | Generator Excitation, Control and Instrumentation | None |
| TS | Traveling Screen[1] | None |
| TSCDG | Technical Support Center Diesel Generator | None |
| TSCHV | Technical Support Center HVAC | None |
| UF | Ultrafiltration | None |
| WF | Water Factory | None |
| WGA | Waste Gas Analyzer | None |

1. Mechanical components of the TS system are pumps, piping, strainers, valves, instruments and controls for the screen wash function. The screen wash components are not required to support the operation of the service water system and have no mechanical system intended function for license renewal. The system also includes the traveling screens; however, these are structural components for license renewal and are evaluated with the intake structure (Section 2.4.2, Water Control Structures).

## Table 2.2-3
## Structures within the Scope of License Renewal

| Structure Name | LRA Section |
|---|---|
| Appendix R Diesel Generator Foundation, Switchgear and Enclosures (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Auxiliary Feedwater Pump Building and Shield Wall area Enclosure (IP2) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Auxiliary Feedwater Building and Shield Wall Area Enclosure (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Boric Acid Evaporator Building (IP2) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| City Water Storage Tank Foundation and Meter House | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Condensate Storage Tanks Foundation (IP2/3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Containment Access Facility and Annex (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Containment Building (IP2) | Section 2.4.1, Containment Buildings |
| Containment Building (IP3) (Vapor Containment) | Section 2.4.1, Containment Buildings |
| Control Building (IP1/2) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Control Building (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Diesel Generator Building (IP2) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Diesel Generator Building (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Discharge Canal and Outfall Structure | Section 2.4.2, Water Control Structures |
| Electrical Tunnel (IP2) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Electrical Tunnel (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |

## Table 2.2-3
## Structures within the Scope of License Renewal (Continued)

| Structure Name | LRA Section |
|---|---|
| Fan House (IP2) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Fan House (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Fire Protection Pump House (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Fire Pump House (IP2) (Diesel Fire Pump House) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Fire Water Storage Tank Foundation (IP2) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Fire Water Storage Tank Foundation (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Fuel Storage Building (IP2) (Fuel Handling Building) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Fuel Storage Building (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Gas Turbine Generator, No. 1, Enclosure and Fuel Tank Foundation | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Gas Turbine Generators, No. 2 and 3, Enclosure and Fuel Tank Foundation | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Gas Turbine Substation Switchgear Structures and Foundation (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Intake Structure (Screenwell House) (IP1) | Section 2.4.2, Water Control Structures |
| Intake Structure (IP2) | Section 2.4.2, Water Control Structures |
| Intake Structure (IP3) | Section 2.4.2, Water Control Structures |
| Intake Structure Enclosure Building (Screenwell House) (IP3) | Section 2.4.2, Water Control Structures |
| Maintenance and Outage Building and Elevated Passageway (IP2) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Manholes and Duct Banks | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |

## Table 2.2-3
## Structures within the Scope of License Renewal (Continued)

| Structure Name | LRA Section |
|---|---|
| New Station Security Building (Command Post and Extension) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Nuclear Service Building  (IP1) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Power Conversion Equipment Building (LCI Building) (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Primary Auxiliary Building  (IP2) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Primary Auxiliary Building  (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Primary Water Storage Tank Foundation (IP2) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Primary Water Storage Tank Foundation (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Radiation Monitoring Enclosure (IP2) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Refueling Water Storage Tank Foundation (IP2) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Refueling Water Storage Tank Foundation (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Security Access and Office Building (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Service Water Pipe Chase (IP3) | Section 2.4.2, Water Control Structures |
| Service Water Valve Pit (IP2/3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Superheater Building (IP1) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Superheater Stack (IP1) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Transformer/Switchyard Support Structures | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |

## Table 2.2-3
## Structures within the Scope of License Renewal (Continued)

| Structure Name | LRA Section |
|---|---|
| Transmission Towers (SBO Recovery Path) and Foundation | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Turbine Building (IP1) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Turbine Building and Heater Bay (IP2) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Turbine Building and Heater Bay (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Utility Tunnel (IP1) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Waste Holdup Tank Pit (IP2) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |
| Waste Holdup Tank Pit (IP3) | Section 2.4.3, Turbine Buildings, Auxiliary Buildings, and Other Structures |

## Table 2.2-4
## Structures Not within the Scope of License Renewal

| Structure Name | UFSAR Reference or Function |
|---|---|
| Administration Building (IP3) (Service Admin Complex) | Provides space for administrative and support personnel |
| Air Monitoring House (IP1) | Located at the entrance to the Unit 1 utility tunnel; provides access and radiological protection to personnel. |
| Auxiliary Boiler Annex and House Service Boiler Building (IP3) | Provides shelter for the auxiliary boiler, service boiler and other miscellaneous equipment. |
| Buchanan Service Center | Houses the emergency operation facility and provides a training area for site personnel. |
| Business Services Building | Provides space and miscellaneous facilities for site personnel. |
| Cafeteria | Provides space and facilities for site personnel. |
| Chemical System Building Addition (Evaporator Building) | Provides facilities for site chemistry personnel. |
| Condensate Polisher Building (IP3) | Provides protection of the condensate polishing system from the external environmental conditions and provides a means of support for system components. |
| Condensate Storage Tanks Foundation (IP1) | Provides support for the IP1 condensate storage tanks. |
| Construction Office Building (Material Service Building, Security and Admin Building) | Provides work space for station personnel. |
| Containment Building (IP1) | Structure has been decommissioned and is no longer in service. |
| Contractor/Outage Entry Trailer | Provides access to the secured area for contractor personnel. |
| De-Icing Pit (IP2/3) | Contains the de-icing equipment pumps. |
| Environmental/Meteorological Building | Provides office space for personnel and environmental activities |
| Fab Shop | Provides office space for site fabrication activities. |

## Table 2.2-4
## Structures Not within the Scope of License Renewal (Continued)

| Structure Name | UFSAR Reference or Function |
|---|---|
| Fuel Handling and Chemical System Building (IP1) | Provides storage for spent fuel from the Unit 1 reactor. It also provides support for the spent fuel crane and other fuel handling equipment. The fuel pool and other components have no specific interactions with Unit 2 or 3 and loss of coolant in the pool will not result in any potential impact on operations. |
| Fuel Oil Storage Tanks Foundation and Pumphouse (IP1) | One tank is retired in place. The second tank holds diesel fuel for site use. A reinforced concrete slab supports the tanks. Fuel oil pumps and heating system are located inside the pumphouse. The tanks and pump house are not credited for any safety functions. |
| Gatehouses 1, 2, 3 and 4 | Provide office space for security personnel and control of access to plant site. |
| Generation Support Building | Provide office space for management, engineering, and administrative personnel. |
| Interim Radwaste Storage Facility (IP3) | Section 11.1 |
| Meteorological Tower and Foundation (IP2/3) | Three different meteorological towers at three different locations. The primary tower is a 400-foot tower located south of the plant and is equipped with a trailer that houses equipment associated with the tower. The IP2 tower is used as a secondary backup and is located approximately 2700 feet north of the primary tower. The third tower is a standby tower located on the roof of the Buchanan Service Center. |
| Mock-up Facility (IP3) | Provides a work area for site personnel. |
| Oil Pump House | Contains components originally used to supply fuel oil to the Unit 1 fuel oil storage tanks. Function is no longer used. |
| Outage Support Building (IP3) (Controlled Area Entrance Building) | Provides office space, training and change areas for personnel. |
| Radio Equipment Building | Provides space for site communication equipment. |
| Radioactive Machine Shop (RAMS) (IP3) | Provides work area facilities for site personnel. |
| Receiving Warehouse (IP3) | Provides temporary office space and a central storage point for plant materials and replacement parts. |

## Table 2.2-4
## Structures Not within the Scope of License Renewal (Continued)

| Structure Name | UFSAR Reference or Function |
|---|---|
| Replaced Steam Generator Storage Facility (IP3) (Original Steam Generator Storage Building) | Section 11.1 |
| Service Boiler Building (IP2) | Provides shelter for the house service boilers and the TSC diesel. |
| Service Building (Administration Office Building)(IP1/2) | Provides an office area for personnel. |
| Sewage Treatment Plant | Functions as a holding tank for sewage; no longer used for sewage treatment. |
| Simulator Building | Used for training site personnel. |
| Steam Generator Storage Building (IP2) | Provides storage for the old steam generators originally installed in the plant. |
| Telecommunication Building | Provides space for communication equipment. |
| TLM Building | Provides miscellaneous warehouse space. |
| Total Dissolved Solids Tank Foundations (IP3) | Support the high and low total dissolved solids tanks, which collect wastewater generated by the condensate polisher facility. |
| Training Center (IP3) | Provides space and facilities for the training of plant and contractor personnel. |
| Visitor’s Center (Entergy Education Center) | Provides space for gym facilities and training of plant and contractor personnel. |
| Warehouses No.1 and 2 | Serve as the central point for the storage of the plant's materials and replacement parts. |
| Wharf Structure | No longer in service. |

## 2.3 SCOPING AND SCREENING RESULTS: MECHANICAL SYSTEMS

This section presents the results of the mechanical scoping and screening process. The systems with mechanical components that are included in the scope of license renewal are described along with the mechanical intended functions that are the basis for including the systems in scope. Electrical and structural intended functions for these systems, as applicable, are not presented in this section.

As described in Section 2.1.1, there are marked differences in the number of IP2 and IP3 systems and in the boundaries for similarly named systems. Because of these differences, the mechanical intended system functions as presented in this section are often different for IP2 and IP3, even for similarly named systems.

## 2.3.1 Reactor Coolant System

### System Description

The reactor coolant system (RCS) includes mechanical components in the following subsystems.

- reactor vessel
- reactor vessel internals
- pressurizer
- steam generators
- reactor coolant pumps
- control rod drives
- in-core instrumentation

### *Unit 2*

Unit 2 system code RCS includes the reactor vessel and internals, reactor coolant pumps, the pressurizer and pressurizer relief tank, and all connecting piping. The steam generators are in the feedwater (FW) system code but are included in the reactor coolant system aging management review. The reactor coolant system evaluation also includes the control rod drive (CRD) system and the in-core instrumentation (ICI) system.

*Reactor Coolant System*

The reactor coolant system consists of four similar heat transfer loops connected in parallel to the reactor vessel. Each loop contains a reactor coolant pump and a steam generator. The system also includes a pressurizer, pressurizer relief tank, connecting piping, and instrumentation necessary for operational control. The reactor coolant system transfers the heat generated in the core to the steam generators, where steam is produced to drive the turbine generator. Cooling water is circulated at the flow rate and temperature consistent with achieving the reactor core thermal-hydraulic performance. The water also acts as a neutron moderator and reflector and as a solvent for the neutron absorber used in chemical shim control.

The reactor coolant system provides a boundary for containing the coolant under operating temperature and pressure conditions. It serves to confine radioactive material and limits, to acceptable values, its uncontrolled release to the secondary system and to other parts of the plant under conditions of either normal or abnormal reactor behavior. The inertia of the reactor coolant pumps provides the necessary flow during a pump coast-down. The layout of the system assures natural circulation capability following a loss of forced flow to permit decay heat removal without overheating the core. Part of the RCS piping is used by the safety injection system to deliver cooling water to the core during a loss-of-coolant accident.

## Reactor Vessel

The reactor vessel is cylindrical in shape with a hemispherical bottom and a flanged and gasketed removable upper head. The upper reactor closure head and the reactor vessel flange are joined by studs. Two metallic O-rings seal the reactor vessel when the reactor closure head is bolted in place. A leak-off connection is provided between the two O-rings to monitor leakage across the inner O-ring. The vessel was designed in accordance with Section III (Nuclear Vessels) of ASME Boiler and Pressure Vessel Code. Coolant enters the reactor vessel through inlet nozzles in a plane just below the vessel flange and above the core. The coolant flows downward through the annular space between the vessel wall and the core barrel into a plenum at the bottom of the vessel, where it reverses direction and flows up through the core. All the coolant is mixed in the upper plenum, and the mixed coolant stream then flows out of the vessel through exit nozzles located on the same plane as the inlet nozzles. The core instrumentation nozzles are located on the lower head and the control rod nozzle penetrations are located on the upper head.

## Reactor Vessel Internals

The reactor vessel internals are designed to direct the coolant flow, support the reactor core, and guide the control rods. The reactor vessel contains the core support assembly, upper plenum assembly, fuel assemblies, control cluster assemblies, surveillance specimens, and in-core instrumentation. The lower core support structure, the upper core support structure, and the incore instrumentation support structure are the three major parts of the reactor vessel internals. A one-piece thermal shield, concentric with the reactor core, is located between the core barrel and the reactor vessel. The shield, which is cooled by the coolant on its downward pass, protects the vessel by attenuating much of the gamma radiation and some of the fast neutrons which escape from the core.

## Pressurizer

Pressure in the system is controlled by the pressurizer, where water and steam pressure is maintained through the use of electrical heaters and sprays. Steam can either be formed by the heaters or condensed by a pressurizer spray to minimize pressure variations due to contraction and expansion of the coolant. The reactor coolant system is protected against overpressure by control and protective circuits such as the high pressure trip and by code relief valves connected to the top head of the pressurizer. The relief valves discharge into the pressurizer relief tank, which condenses and collects the valve effluent. Two power-operated relief valves and three code safety valves are provided to protect against pressure surges that are beyond the pressure limiting capacity of the pressurizer spray. The power operated relief valves also operate from the overpressure protection system to prevent RCS pressure from exceeding the limits of Appendix G of Section III of the ASME Pressure Vessel Code during low temperature operation.

Steam and water discharge from the power relief and safety valves passes to the pressurizer relief tank, which is partially filled with water at or near ambient containment conditions. The tank normally contains water in a predominantly nitrogen atmosphere. Steam is discharged under the water level to condense and cool by mixing with the water. The tank is protected against a discharge exceeding the design value by rupture discs that discharge into the reactor containment.

### Steam Generators

Each loop contains a vertical shell and U-tube steam generator. Reactor coolant enters the inlet side of the channel head at the bottom of the steam generator through the inlet nozzle, flows through the U-tubes to an outlet channel, and leaves the generator through another bottom nozzle. The inlet and outlet channels are separated by a partition. Feedwater to the steam generator enters just above the top of the U-tubes through a feedwater ring. The water flows downward through an annulus between the tube wrapper and the shell and then upward through the tube bundle where it is converted to a steam-water mixture. The steam-water mixture from the tube bundle passes through a primary separator assembly that reduces the water content in the mixture. The separated water combines with the feedwater for another pass through the tube bundle. The remaining higher quality steam-water mixture rises through additional secondary separators which further reduce the moisture content of the steam.

### Reactor Coolant Pumps

Each reactor coolant loop contains a vertical single-stage centrifugal pump that employs a controlled leakage seal assembly. Reactor coolant is pumped by the impeller attached to the bottom of the rotor shaft. The coolant is drawn up through the impeller, discharged through passages in the diffuser and out through a discharge nozzle in the side of the casing. A flywheel at the top of the rotor shaft extends the pump coastdown flow in the event of a loss of power to the pump motor. A portion of the flow from the chemical and volume control system (CVCS) charging pumps is injected into the reactor coolant pump between the impeller and the controlled leakage seal. Component cooling water is supplied to the motor bearing oil coolers and the thermal barrier cooling coil.

The RCS system has the following intended functions for 10 CFR 54.4(a)(1).

- Remove sensible and decay heat from the reactor core via natural circulation or forced circulation following design basis accidents.

- Provide a pressure boundary capable of withstanding anticipated temperatures, pressures and seismic accelerations.
- Provide containment isolation capability for lines penetrating containment.
- Provide the capability to vent non-condensable gases from the RCS that may impair emergency core cooling or natural circulation following design basis accidents.
- Provide hot and cold overpressure protection for the reactor vessel and other RCS components.
- Provide a path for coolant to the core following a LOCA.

The RCS system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The RCS system has the following intended functions for 10 CFR 54.4(a)(3).[1]

- Support the evaluation for pressurized thermal shock (10 CFR 50.61).
- The RCS is credited with maintaining its pressure boundary and providing core cooling and removal of sensible heat during a safe shutdown following a fire, station blackout or ATWS.

*Control Rod Drive*

The purpose of the control rod drive system is to provide a means to position the control rods within the core. The reactor uses the Westinghouse magnetic-type control rod drive assemblies that are located on the upper reactor vessel head. These drives provide a means to insert or withdraw control rods in the core to control the nuclear power generated. Upon a loss of power to the coils, the rod cluster control assemblies with full-length absorber rods are released and fall by gravity into the core. Each control rod drive assembly is designed as a hermetically sealed unit to prevent leakage of reactor coolant. All pressure-containing components are designed to meet the requirements of the ASME Code, Section III, Division 1 for Class A vessels.

The CRD system has the following intended functions for 10 CFR 54.4(a)(1)

- Provide reactor coolant system pressure boundary integrity.
- Release the control rods upon receipt of a reactor trip signal to ensure rapid shutdown and reactivity control.

The CRD system has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

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[1] For Unit 2, RCP oil collection components are included in the fire protection system (Section 2.3.3.12), so their intended function is not listed here.

*In-Core Instrumentation*

The purpose of the in-core instrumentation (ICI) is to provide information on the neutron flux distribution and fuel assembly outlet temperatures at selected core locations. Using the information obtained from the in-core instrumentation system, it is possible to confirm the reactor core design parameters and calculated hot channel factors. The system provides means for acquiring data and performs no operational plant control.

The in-core instrumentation system consists of thermocouples, positioned to measure fuel assembly coolant outlet temperature at preselected locations; flux thimbles, which run the length of selected fuel assemblies to measure the neutron flux distribution within the reactor core using moveable in-core detectors; and in-core drives, drive motors, positioning equipment and instruments. The flux thimbles, seal table and guide tube form part of the reactor coolant pressure boundary.

The in-core instrumentation system includes the pressure-retaining guide tubes that form part of the reactor coolant pressure boundary. For Unit 2, other, non-pressure boundary portions of the in-core instrumentation are included in the RCS system and the nuclear instrumentation system (listed in Table 2.2-1b-IP2 with the EIC systems).

The in-core instrumentation system has the following intended function for 10 CFR 54.4(a)(1).

- Provide reactor coolant system/pressure boundary integrity via the in-core thermocouple guide tube and seals.

The in-core instrumentation system has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

*Unit 3*

Unit 3 system code RCS includes the reactor vessel and internals, reactor coolant pumps, RCP oil collection tanks, the steam generators, and all connecting piping. The pressurizer has a separate system code (PZR). System code SG is the steam generator (secondary side instrumentation). The reactor coolant system evaluation also includes the control rod drive (CRD) system, the in-core instrumentation (INCOR) system, and the reactor vessel level instrumentation system (RVLIS).

*Reactor Coolant System*

The reactor coolant system consists of four similar heat transfer loops connected in parallel to the reactor vessel. Each loop contains a reactor coolant pump and a steam generator. The reactor coolant system transfers the heat generated in the core to the steam generators, where steam is produced to drive the turbine generator. Cooling water is circulated at the flow rate and temperature consistent with achieving the reactor core thermal-hydraulic performance. The water also acts as a neutron moderator and reflector and as a solvent for the neutron absorber used in chemical shim control.

The reactor coolant system provides a boundary for containing the coolant under operating temperature and pressure conditions. It serves to confine radioactive material and limits, to acceptable values, its uncontrolled release to the secondary system and to other parts of the plant under conditions of either normal or abnormal reactor behavior. The layout of the system assures natural circulation capability following a loss of forced flow to permit decay heat removal without overheating the core. The system is connected to a pressurizer, included in the PZR system code, which maintains the required RCS pressure during steady-state operation, limits the pressure changes during normal load transients, and prevents the system from exceeding the RCS design pressure. Part of the RCS piping is used by the safety injection system to deliver cooling water to the core during a loss-of-coolant accident.

Reactor Vessel

The reactor vessel is cylindrical in shape with a hemispherical bottom head and a flanged and gasketed removable upper head. The upper reactor closure head and the reactor vessel flange are joined by studs. Two metallic O-rings seal the reactor vessel when the reactor closure head is bolted in place. A leak-off connection is provided between the two O-rings to monitor leakage across the inner O-ring. The vessel was designed in accordance with Section III (Nuclear Vessels) of ASME Boiler and Pressure Vessel Code. Coolant enters the reactor vessel through inlet nozzles in a plane just below the vessel flange and above the core. The coolant flows downward through the annular space between the vessel wall and the core barrel into a plenum at the bottom of the vessel, where it reverses direction and flows up through the core. All the coolant is mixed in the upper plenum, and the mixed coolant stream then flows out of the vessel through exit nozzles located on the same plane as the inlet nozzles. The core instrumentation nozzles are located on the lower head and the control rods are located on the upper head.

Reactor Vessel Internals

The reactor vessel internals are designed to direct the coolant flow, support the reactor core, and guide the control rods. The reactor vessel contains the core support assembly, upper plenum assembly, fuel assemblies, control cluster assemblies, surveillance specimens, and in-core instrumentation. The lower core support structure, the upper core support structure, and the incore instrumentation support structure are the three major parts of the reactor vessel internals. A one-piece thermal shield, concentric with the reactor core, is located between the core barrel and the reactor vessel. The shield, which is cooled by the coolant on its downward pass, protects the vessel by attenuating much of the gamma radiation and some of the fast neutrons which escape from the core.

Steam Generators

Each loop contains a vertical shell and U-tube steam generator. Reactor coolant enters the inlet side of the channel head at the bottom of the steam generator through the inlet nozzle, flows through the U-tubes to an outlet channel and leaves the generator through another bottom nozzle. The inlet and outlet channels are separated by a partition. Feedwater to the steam generator enters just above the top of the U-tubes through a feedwater ring. The water flows downward through an annulus between the tube wrapper and the shell and then upward through the tube bundle, where it is converted to a steam-water mixture. The steam-water mixture from the tube bundle passes through a primary separator assembly, which reduces the water content in the mixture. The separated water combines with the feedwater for another pass through the tube bundle. The remaining higher quality steam-water mixture rises through additional secondary separators that further reduce the moisture content of the steam.

Reactor Coolant Pumps

Each reactor coolant loop contains a vertical single-stage centrifugal pump that employs a controlled leakage seal assembly. Reactor coolant is pumped by the impeller attached to the bottom of the rotor shaft. The coolant is drawn up through the impeller, discharged through passages in the diffuser and out through a discharge nozzle in the side of the casing. A flywheel at the top of the rotor shaft extends the pump coastdown flow in the event of a loss of power to the pump motor. A portion of the flow from the CVCS charging pumps is injected into the reactor coolant pump between the impeller and the controlled leakage seal. Component cooling water is supplied to the motor bearing oil coolers and the thermal barrier cooling coil.

The RCS system has the following intended functions for 10 CFR 54.4(a)(1).

- Remove sensible and decay heat from the reactor core via natural circulation or forced circulation following design basis accidents.
- Provide a pressure boundary capable of withstanding all anticipated temperatures, pressures, and seismic accelerations.
- Provide the capability to vent non-condensable gases from the RCS that may impair emergency core cooling or natural circulation following design basis accidents.
- Provide a path for coolant to the core following a LOCA.
- Provide primary to secondary heat transfer (steam generators).
- Provide part of the reactor coolant pressure boundary (steam generators).
- Maintain secondary system pressure boundary to support primary heat removal (steam generators).

The RCS system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function (includes RCP oil collection tanks).

The RCS system has the following intended functions for 10 CFR 54.4(a)(3).

- Support the evaluation for pressurized thermal shock (10 CFR 50.61).
- Provide RCP oil collection capability as required by Appendix R (10 CFR 50.48).
- The RCS is credited with maintaining its pressure boundary and providing core cooling and removal of sensible heat during a safe shutdown following a fire (10 CFR 50.48), station blackout (10 CFR 50.63), or ATWS (10 CFR 50.62).

*Pressurizer*

The purpose of the pressurizer (PZR system) is to maintain the required reactor coolant pressure during steady-state operation, limit the pressure changes caused by coolant thermal expansion and contraction during normal load transients, and prevent the pressure in the reactor coolant system from exceeding the design pressure. Pressure in the pressurizer is maintained through the use of electrical heaters and sprays. Steam can either be formed by the heaters or condensed by a pressurizer spray to minimize pressure variations due to contraction and expansion of the coolant. The pressurizer was designed to accommodate inflow and outflow surges caused by load transients. The surge line, which is attached to the bottom of the pressurizer, connects the pressurizer to the hot leg of a reactor coolant loop. The pressurizer protects the reactor coolant system from overpressure by code relief valves connected to the top head of the pressurizer. Two power-operated relief valves and three code safety valves are provided to protect against pressure surges which are beyond the pressure limiting capacity of the pressurizer spray. The power operated relief valves also operate from the overpressure protection system to prevent RCS pressure from exceeding the limits of Appendix G of Section III of the ASME Pressure Vessel Code during low temperature operation.

Steam and water discharge from the power relief and safety valves passes to the pressurizer relief tank, which is partially filled with water at or near ambient containment conditions. The tank normally contains water in a predominantly nitrogen atmosphere. Steam is discharged under the water level to condense and cool by mixing with the water. The tank is protected against a discharge exceeding the design value by rupture discs that discharge into the reactor containment.

The PZR system includes the pressurizer, the pressurizer relief valves, power-operated relief valves, spray line components, pressurizer relief tank, piping, valves, instruments and controls. The system includes several containment penetrations supporting the pressurizer relief tank.

The PZR system has the following intended function for 10 CFR 54.4(a)(1).

- Maintain the integrity of the reactor coolant system pressure boundary.
- Provide pressure relief capability via the pressurizer safety valves during over-pressure transients.
- Provide a means to depressurize the RCS via the power-operated relief valves relieving to the pressurizer relief tank following a steam generator tube rupture.
- Provide low temperature over-pressure protection of the reactor vessel via the power-operated relief valves during plant start-up and shutdown.
- Provide containment isolation capability for lines penetrating containment.

The PZR system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The PZR system has the following intended functions for 10 CFR 54.4(a)(3).

- The PZR is credited with maintaining its pressure boundary to support the RCS functions of providing core cooling and removal of sensible heat during a safe shutdown following a fire (10 CFR 50.48).
- The PZR is credited with maintaining its pressure boundary to support the RCS functions of providing core cooling and removal of sensible heat during a station blackout (10 CFR 50.63).

*Control Rod Drive*

The purpose of the control rod drive (CRD) system is to provide a means to position the control rods within the core. The reactor uses the Westinghouse magnetic-type control rod drive assemblies that are located on the upper reactor vessel head. These drives provide a means to insert or withdraw control rods in the core to control the nuclear power generated. Upon a loss of power to the coils, the rod cluster control assemblies with full-length absorber rods are released and fall by gravity into the core. Each control rod drive assembly is designed as a hermetically sealed unit to prevent leakage of reactor coolant. All pressure-containing components are designed to meet the requirements of the ASME Code, Section III, Division 1 for Class A vessels.

The CRD system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide reactor coolant system pressure boundary integrity.
- Release the control rods upon receipt of a reactor trip signal to ensure rapid shutdown and reactivity control.

The CRD system has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

*In-Core Instrumentation*

The purpose of the in-core instrumentation (INCOR system) is to provide information on the neutron flux distribution and fuel assembly outlet temperatures at selected core locations. Using the information obtained from the in-core instrumentation system, it is possible to confirm the reactor core design parameters and calculated hot channel factors. The system provides means for acquiring data and performs no operational plant control.

The in-core instrumentation system consists of thermocouples, positioned to measure fuel assembly coolant outlet temperature at preselected locations; flux thimbles, which run the length of selected fuel assemblies to measure the neutron flux distribution within the reactor core using moveable in-core detectors; and in-core drives, drive motors, positioning equipment and instruments. The flux thimbles, seal table and guide tube form part of the reactor coolant pressure boundary.

The in-core instrumentation system has the following intended function for 10 CFR 54.4(a)(1).

- Provide reactor coolant system/pressure boundary integrity via the in-core thermocouple guide tube and seals.

The in-core instrumentation system has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

*Reactor Vessel Level Instrumentation*

The purpose of the RVLIS is to monitor the water level in the reactor vessel or relative voids in the RCS during accident conditions. The level instrumentation gives level indication from the bottom of the reactor vessel to the top of the reactor head during natural circulation conditions and indication of reactor vessel liquid level for any combination of running RCPs. The RVLIS utilizes RCS penetrations leading to manual isolation valves. At the valves are sealed capillary impulse lines which transmit pressure measurements to transmitters located outside the containment building. The capillary impulse lines are sealed at the RCS end and at the penetrations with sensor bellows, which serve as hydraulic couplers. The impulse lines extend through the containment wall to hydraulic isolators which seal and isolate the lines as well as provide hydraulic coupling to capillary tubes going to the transmitters.

The RVLIS system has the following intended functions for 10 CFR 54.4(a)(1).

- Maintain the reactor coolant pressure boundary (function performed by Class 1 RCS components that are part of this system code in the database).
- Provide containment isolation capability for lines penetrating containment.

The RVLIS system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The RVLIS system has no intended functions for 10 CFR 54.4(a)(3).

*Steam Generator (Secondary Side Instrumentation)*

The purpose of the SG system is to provide steam generator secondary side instrumentation. This system code includes the passive mechanical instrument piping and valves for the steam generator secondary side level instrumentation. These components are safety-related since they form part of the pressure boundary for the steam generators.

The SG system has the following intended functions for 10 CFR 54.4(a)(1).

- Maintain secondary system pressure boundary to support primary heat removal.
- Support containment boundary as a closed system extension of the containment.

The SG system has no intended function for 10 CFR 54.4(a)(2).

The SG system has the following intended functions for 10 CFR 54.4(a)(3).

- Maintain the pressure boundary for the steam generator secondary side for secondary cooling following a fire (10 CFR 50.48) or station blackout (10 CFR 50.63).

*Steam Generator Level Control*

The purpose of the steam generator level control (SGLC) system is to support the control of feedwater flow to maintain steam generator secondary side level. The SGLC system is primarily an electrical system; however, it does include several level instrument vent valves. These components are safety-related since they form part of the pressure boundary for the steam generators.

The SGLC system has the following intended functions for 10 CFR 54.4(a)(1).

- Maintain secondary system pressure boundary to support primary heat removal.
- Support containment boundary as a closed system extension of the containment.

The SGLC system has no intended function for 10 CFR 54.4(a)(2).

The SGLC system has the following intended functions for 10 CFR 54.4(a)(3).

- Maintain the pressure boundary for the steam generator secondary side for secondary cooling following a fire (10 CFR 50.48) or station blackout (10 CFR 50.63).

UFSAR References

| *Unit 2* | | *Unit 3* | |
|---|---|---|---|
| RCS | Chapters 3 and 4 | RCS | Sections 3.2 and 4.2 (includes the pressurizer) |
| CRD | Sections 3.1.3.4.4 and 3.2.3.4 | CRD | Sections 3.1.3 and 7.3 |
| In-cores | Sections 3.2.3.1.1.3 and 7.6 | In-cores | Section 7.6 |
| | | RVLIS | Section 7.5.2 |
| | | SG | Sections 4.2.2 and 7.3.2 |
| | | SGLC | Section 7.3 |

Components Subject to Aging Management Review

The RCS Class I piping evaluation boundary extends into portions of systems attached to the RCS. For both units, the Class I components of the systems listed below are included in the RCS aging management review. The non-Class 1 portions of the systems listed below are reviewed as referenced.

- Chemistry and Volume Control System (CVCS) (Section 2.3.3.6)
- Isolation Valve Seal Water (IVSW) (Section 2.3.2.3)
- Primary Sampling System (PS) (Section 2.3.3.19)
- Residual Heat Removal (RHR) (Section 2.3.2.1)
- Safety Injection System (SIS) (Section 2.3.2.4)

Unit 2 RCS components containing air are evaluated with compressed air systems (Section 2.3.3.4). A small number of Unit 2 RCS components are evaluated with the primary makeup water systems (Section 2.3.3.7) and the nitrogen systems (Section 2.3.3.5).

Unit 3 RCS RCP lube oil collection components are evaluated with the fire protection – $CO_2$, halon and RCP oil collection systems (Section 2.3.3.12), with the Unit 2 RCP lube oil collection components. (Unit 2 RCP lube oil collection components are part of the Unit 2 fire protection system, not the RCS.)

Components in the Unit 3 nitrogen supply to the power-operated relief valves (PORVs) are evaluated with the nitrogen systems (Section 2.3.3.5). A small number of Unit 3 PZR components are evaluated with the primary makeup water systems (Section 2.3.3.7).

The following components are evaluated with containment penetrations (Section 2.3.2.5):

- Unit 2 RCS containment penetration components not part of the reactor coolant pressure boundary;
- Unit 3 PZR system containment penetration components; and
- certain mechanical Unit 3 RVLIS components.

For Unit 2 RCS and Unit 3 RCS, PZR, and RVLIS, nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19).

Fuel assemblies are not subject to aging management review as they are replaced after a limited number of fuel cycles. The control rods are active components and are not subject to aging management review.

Aging management review of the remaining RCS components is covered by four separate reviews:

- reactor vessel (Section 2.3.1.1),
- reactor vessel internals (Section 2.3.1.2),
- reactor coolant pressure boundary (RCPB) (Section 2.3.1.3) and,
- steam generators (Section 2.3.1.4).

Table 2.3.1-1-IP2 through Table 2.3.1-4-IP2 list the components that require aging management review and their intended functions.

Table 3.1.2-1-IP2 through Table 3.1.2-4-IP3 provide the results of the aging management review for RCS components and components evaluated with the RCS.

License Renewal Drawings

Related license renewal drawings are listed in Section 2.3.1.3, Reactor Coolant Pressure Boundary, and Section 2.3.1.4, Steam Generators.

### 2.3.1.1 Reactor Vessel

The reactor vessel for each unit is described in the reactor coolant system description (Unit 2, Reactor Vessel; Unit 3 Reactor Vessel).

For each unit, the evaluation boundary for the reactor vessel encompasses the reactor vessel pressure boundary subcomponents, which includes the shell, top and bottom heads, closure head stud assembly, primary nozzles and safe ends, control rod drive mechanism (CRDM) housing penetrations, bottom mounted instrumentation (BMI) flux thimble tube penetrations, guide tubes, and seal table. Other subcomponents included that support the intended functions of the reactor vessel are the core support pads / core guide lugs, vessel flange, and closure head lifting lugs.

Table 2.3.1-1-IP2 and Table 2.3.1-1-IP3 list the mechanical components subject to aging management review and component intended functions for the reactor vessel and the pressure boundary subcomponents of the control rod drive mechanisms.

Table 3.1.2-1-IP2 and Table 3.1.2-1-IP3 provide the results of the aging management review for reactor vessel and the pressure boundary subcomponents of the control rod drive mechanisms.

### 2.3.1.2 Reactor Vessel Internals

The reactor vessel internals for each unit are described in the reactor coolant system description (Unit 2, Reactor Vessel Internals; Unit 3, Reactor Vessel Internals).

For both units, the lower core support structure, the upper core support structure, and the incore instrumentation support structure are the three major parts of the reactor internals.

*Lower Core Support Structure*

The major member of the reactor vessel internals is the lower core support structure consisting of the following components included in this evaluation.

- core baffle/former assembly: bolts
- core baffle/former assembly: plates
- core barrel assembly: bolts, screws
- core barrel assembly: axial flexure plates, flange, ring, shell, thermal shield
- core barrel assembly: outlet nozzles
- lower internals assembly: clevis insert bolt
- lower internals assembly: clevis insert
- lower internals assembly: intermediate diffuser plate
- lower internals assembly: fuel alignment pin
- lower internals assembly: lower core plate
- lower internals assembly: lower core support plate column sleeves
- lower internals assembly: lower core support column bolt
- lower internals assembly, lower core support column castings: column cap, lower core support
- lower internals assembly: radial key
- lower internals assembly: secondary core support (energy absorbing device)
- specimen guides (not subject to aging management review)
- specimen plugs (installed in IP2 only; not subject to aging management review)

The lower core support structure is supported at its upper flange from a ledge in the reactor vessel. Within the core barrel are a core baffle and a lower core plate, both of which are attached to the core barrel wall. The lower core support structure provides passageways for the coolant flow. The lower core plate at the bottom of the core below the baffle plates provides support and orientation for the fuel assemblies. Fuel alignment pins (two for each assembly) are also inserted into this plate. Columns are placed between the lower core plate and core support casting in order to provide stiffness and to transmit the core load to the core support casting. Adequate coolant distribution is obtained through the use of the lower core plate and a diffuser plate.

*Upper Core Support Structure*

The "top hat with deep beam features" upper core support structure consists of the following components included in this evaluation.

- upper internals assembly, rod control cluster assembly (RCCA) guide tube assembly: bolts
- upper internals assembly, RCCA guide tube assembly: guide tube
- upper internals assembly, RCCA guide tube assembly: support pin
- upper internals assembly: core plate alignment pin
- upper internals assembly: head/vessel alignment pin
- upper internals assembly: hold-down spring
- upper internals assembly: support column
- upper internals assembly, mixing devices: support column orifice base, support column mixer
- upper internals assembly: upper core plate, fuel alignment pin
- upper internals assembly: support assembly, upper support plate
- upper internals assembly: upper support column bolt

The support columns establish the spacing between the upper support assembly and the upper core plate and are fastened at top and bottom to these plates and beams.

The RCCA guide tube assemblies shield and guide the control rod drive shafts and control rods. They are fastened to the upper support and are guided by pins in the upper core plate for proper orientation and support. Additional guidance for the control rod drive shafts is provided by the control rod shroud tube which is attached to the upper support plate and guide tube.

*In-Core Instrumentation Support Structure*

The in-core instrumentation support structures consist of the following components included in this evaluation.

- thermocouple conduit
- flux thimble guide tube
- bottom mounted instrumentation column

An upper system (thermocouple conduit) is used to convey and support thermocouples penetrating the vessel through the head, and a lower system (flux thimble guide tube) is used to convey and support flux thimbles penetrating the vessel through the bottom.

The upper system utilizes the reactor vessel head penetrations. Instrumentation port columns are slip-connected to in-line columns that are in turn fastened to the upper support plate. These port columns protrude through the head penetrations. The thermocouples are carried through these port columns and the upper support plate at positions above their readout locations. The thermocouple conduits are supported from the columns of the upper core support system.

Table 2.3.1-2-IP2 and Table 2.3.1-2-IP3 list the mechanical components subject to aging management review and component intended functions for the reactor vessel internals.

Table 3.1.2-2-IP2 and Table 3.1.2-2-IP3 provide the results of the aging management review for the reactor vessel internals.

### 2.3.1.3 Reactor Coolant Pressure Boundary

The reactor coolant pressure boundary (RCPB) evaluation includes the pressurizer, the reactor coolant pumps, the interconnecting piping and fittings, system valves, and bolting associated with the included components. Piping and valves from connected systems that complete the RCPB are also included. The majority of the components included in this evaluation have the RCS system code in the component database. However, multiple components from interconnecting systems are included in this report since their safety function is to maintain the RCPB. System codes included are CVCS, IVSW, PS (and PSS), PZR, RHR, RVLIS, SI (and SIS).

The RCPB piping consists of the primary loops to and from the reactor pressure vessel (RPV), steam generator (SG), and reactor coolant pumps (RCPs). The main reactor coolant piping and fittings are austenitic stainless steel.

Smaller piping, including the pressurizer surge and spray lines, drains and connections to other systems, is austenitic stainless steel. Piping connections are welded except for flanged connections at the pressurizer relief tank and at the relief and safety valves. A listing of the lines comprising the RCPB is given below.

- reactor coolant loops
- pressurizer surge line
- pressurizer spray lines
- auxiliary spray line
- pressurizer relief lines (IP3 includes a flex hose)
- safety injection lines (SI)
- accumulator discharge lines (SI)
- residual heat removal lines (RHR)
- letdown line and excess letdown line (CVCS)
- charging lines (CVCS)
- reactor vessel level instrumentation lines (RVLIS)
- reactor vessel head vent line
- reactor vessel flange leakoff line
- fill, drain and vent lines
- sample lines (piping, tubing, orifice and delay coil)
- instrumentation piping and tubing
- isolation valve seal water (IVSW) tubing
- thermal sleeves
    - return lines from the RHR loop (safety injection lines) to the loops
    - pressurizer surge line hot leg connection
    - charging lines connections to the loops
    - auxiliary charging line connections to the loops

- branch nozzles
- fittings (caps, elbows, orifices, scoops, thermowells, flow restrictors (3/8"), etc.)

Table 2.3.1-3-IP2 and Table 2.3.1-3-IP3 list the mechanical components subject to aging management review and component intended functions for the RCPB and pressurizer.

Table 3.1.2-3-IP2 and Table 3.1.2-3-IP3 provide the results of the aging management review for the RCPB and pressurizer.

Additional details for components subject to aging management review are provided in the following license renewal drawings.

| System | Unit 2 | Unit 3 |
|---|---|---|
| Chemistry and Volume Control | LRA-208168 | LRA-9321-27363 |
| Isolation Valve Seal Water | LRA-9321-2746 | LRA-9321-27463 |
| Primary Sampling | LRA-9321-2745 | LRA-9321-27453 |
| Pressurizer | LRA-9321-2738 | LRA-9321-27473 |
| Reactor Coolant, Sheet 1 | LRA-9321-2738 | LRA-9321-27383 |
| Residual Heat Removal | LRA-9321-2720 | LRA-9321-27203 |
| Reactor Vessel Level Indication | LRA-208798 | LRA-9321-72043 |
| Safety Injection | LRA-235296 | LRA-9321-27353 |

### 2.3.1.4 Steam Generators

Steam generators for each unit are described in the reactor coolant system description (Unit 2, Steam Generators, and Unit 3, Steam Generators).

Four vertical shell and U-tube steam generators are provided at each unit. Both units use the Westinghouse Model 44F steam generator (SG); however, design and material property differences exist between the SGs (as identified below). Unit 2 replaced its steam generators during an outage completed in January 2001. Unit 3 had replaced its steam generators during the refueling outage completed in June 1989.

The steam generators are designed and manufactured in accordance with Section III (Nuclear Vessels) of the ASME Boiler and Pressure Vessel Code. The IP2 steam generators were constructed to the 1980 edition, through the Winter 1981 addenda. The IP3 steam generators were constructed to the 1983 edition, through the Summer 1984 addenda.

The steam generators are constructed primarily of carbon (low alloy) steel. The heat transfer tubes are Inconel: Alloy 600 for IP2, and Alloy 690 for IP3. The tubes were thermally treated after tube-forming operations. The interior surfaces of the channel heads and nozzles are clad with austenitic stainless steel, and the tube sheet surfaces in contact with reactor coolant are clad with Inconel. The tube-to-tube sheet joints are welded. The primary nozzles are provided with safe ends with weld metal overlay.

Table 2.3.1-4-IP3 and Table 2.3.1-4-IP2 list the mechanical components subject to aging management review and component intended functions for the steam generators.

Table 3.1.2-4-IP2 and Table 3.1.2-4-IP3 provide the results of the aging management review for the steam generators.

Additional details for components subject to aging management review are provided in the following license renewal drawings

LRA-9321-2019
LRA-9321-20193
LRA-9321-2017
LRA-9321-20173
LRA-9321-2738
LRA-9321-27383

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### Table 2.3.1-1-IP2
### Reactor Vessel
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bottom-mounted guide tube<br>• guide tubes | Pressure boundary |
| Bottom-mounted instrumentation<br>• flux thimble tube<br>• bullet plug<br>• seal table | Pressure boundary |
| Closure head<br>• closure head<br>• studs<br>• nuts<br>• washers | Pressure boundary |
| Closure head<br>• flange | Pressure boundary<br>Structural support |
| Control rod drive head penetration<br>• core exit thermocouple nozzle assembly (CETNA)<br>• housing adapter flange<br>• housing tube (nozzle)<br>• pressure housing<br>• pressure housing cap (latch housing) | Pressure boundary |
| Nozzles<br>• inlet / outlet<br>• closure head vent | Pressure boundary |
| Nozzle safe ends and welds<br>• inlet / outlet safe ends<br>• inlet / outlet safe end welds<br>• closure head vent | Pressure boundary |
| Penetrations<br>• bottom head instrument tubes<br>• bottom head safe ends and welds | Pressure boundary |

### Table 2.3.1-1-IP2 (Continued)
### Reactor Vessel
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Vessel external attachments<br>• lifting lugs<br>• vessel support pads | Structural support |
| Vessel external attachments<br>• refueling seal support ring | Pressure boundary |
| Vessel internal attachments<br>• core support lugs (pads) | Structural support |
| Vessel shell<br>• bottom head<br>• upper<br>• intermediate (including beltline welds)<br>• lower (including beltline welds)<br>• vessel flange | Pressure boundary |

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### Table 2.3.1-1-IP3
### Reactor Vessel
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bottom-mounted instrumentation<br>• guide tubes<br>• flux thimble tube<br>• bullet plug<br>• seal table | Pressure boundary |
| Closure head<br>• closure head<br>• studs<br>• nuts<br>• washers | Pressure boundary |
| Closure head<br>• flange | Pressure boundary<br>Structural support |
| Control rod drive head penetration<br>• CETNA<br>• housing adapter flange<br>• housing tube (nozzle)<br>• pressure housing<br>• pressure housing cap (latch housing) | Pressure boundary |
| Nozzles<br>• inlet / outlet<br>• closure head vent | Pressure boundary |
| Nozzle safe ends and welds<br>• inlet / outlet safe ends<br>• inlet / outlet safe end welds<br>• closure head vent | Pressure boundary |
| Penetrations<br>• bottom head instrument tubes<br>• bottom head safe ends and welds | Pressure boundary |
| Vessel external attachments<br>• lifting lugs<br>• vessel support pads | Structural support |

### Table 2.3.1-1-IP3 (Continued)
### Reactor Vessel
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Vessel external attachments<br>• refueling seal support ring | Pressure boundary |
| Vessel internal attachments<br>• core support lugs (pads) | Structural support |
| Vessel shell<br>• bottom head<br>• upper<br>• intermediate (including beltline welds)<br>• lower (including beltline welds)<br>• vessel flange | Pressure boundary |

### Table 2.3.1-2-IP2
### Reactor Vessel Internals
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| *Lower Core Support Structure* | |
| Core baffle/former assembly<br>• bolts | Structural support |
| Core baffle/former assembly<br>• plates | Structural support<br>Flow distribution<br>Shielding |
| Core barrel assembly<br>• bolts and screws | Structural support |
| Core barrel assembly<br>• axial flexure plates<br>• flange<br>• ring<br>• shell<br>• thermal shield | Structural support<br>Flow distribution<br>Shielding |
| Core barrel assembly<br>• outlet nozzles | Flow distribution |
| Lower internals assembly<br>• clevis insert bolt<br>• clevis insert<br>• fuel alignment pin<br>• lower core support plate column sleeves<br>• lower core support plate column bolt<br>• radial key | Structural support |
| Lower internals assembly<br>• intermediate diffuser plate | Flow distribution |

## Table 2.3.1-2-IP2 (Continued)
## Reactor Vessel Internals
## Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Lower internals assembly<br>• lower core plate<br>• lower core support castings<br>• column cap<br>• lower core support<br>• secondary core support | Structural support<br>Flow distribution |
| *Upper Core Support Structure—Upper Internals Assembly* | |
| RCCA guide tube assembly<br>• bolt<br>• guide tube<br>• support pin | Structural support |
| Core plate alignment pin | Structural support |
| Head / vessel alignment pin | Structural support |
| Hold-down spring | Structural support |
| Mixing devices<br>• support column orifice base<br>• support column mixer | Structural support<br>Flow distribution |
| Support column | Structural support |
| Upper core plate, fuel alignment pin | Structural support<br>Flow distribution |
| Upper support plate, support assembly | Structural support |
| Upper support column bolt | Structural support |
| *Incore Instrumentation Support Structure* | |
| Bottom mounted instrumentation column | Structural support |
| Flux thimble guide tube | Structural support |

### Table 2.3.1-2-IP2 (Continued)
### Reactor Vessel Internals
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Thermocouple conduit | Structural support |

### Table 2.3.1-2-IP3
### Reactor Vessel Internals
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| *Lower Core Support Structure* | |
| Core baffle/former assembly<br>• bolts | Structural support |
| Core baffle/former assembly<br>• plates | Structural support<br>Flow distribution<br>Shielding |
| Core barrel assembly<br>• bolts and screws | Structural support |
| Core barrel assembly<br>• axial flexure plates<br>• flange<br>• ring<br>• shell<br>• thermal shield | Structural support<br>Flow distribution<br>Shielding |
| Core barrel assembly<br>• outlet nozzles | Flow distribution |
| Lower internals assembly<br>• clevis insert bolt<br>• clevis insert<br>• fuel alignment pin<br>• lower core support plate column bolt<br>• lower core support plate column sleeves<br>• radial key | Structural support |
| Lower internals assembly<br>• intermediate diffuser plate | Flow distribution |

### Table 2.3.1-2-IP3 (Continued)
### Reactor Vessel Internals
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Lower internals assembly<br>• lower core plate<br>• lower core support castings<br>• column cap<br>• lower core support<br>• secondary core support | Structural support<br>Flow distribution |
| *Upper Core Support Structure—Upper Internals Assembly* | |
| RCCA guide tube assembly<br>• bolt<br>• guide tube<br>• support pin | Structural support |
| Core plate alignment pin | Structural support |
| Head / vessel alignment pin | Structural support |
| Hold-down spring | Structural support |
| Mixing devices<br>• support column orifice base<br>• support column mixer | Structural support<br>Flow distribution |
| Support column | Structural support |
| Upper core plate, fuel alignment pin | Structural support<br>Flow distribution |
| Upper support plate, support assembly | Structural support |
| Upper support column bolt | Structural support |
| *Incore Instrumentation Support Structure* | |
| Bottom mounted instrumentation column | Structural support |
| Flux thimble guide tube | Structural support |

### Table 2.3.1-2-IP3 (Continued)
### Reactor Vessel Internals
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Thermocouple conduit | Structural support |

### Table 2.3.1-3-IP2
### Reactor Coolant Pressure Boundary
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bolting | Pressure boundary |
| Fittings (elbows, flanges, scoops, tees, etc.) | Pressure boundary |
| Heat exchanger (bonnet) | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Heater sheath | Pressure boundary |
| Heater wells | Pressure boundary |
| Manway cover | Pressure boundary |
| Manway insert plate | Pressure boundary |
| Nozzle | Pressure boundary |
| Orifice | Flow control<br>Pressure boundary |
| Piping ≥ 4” nps | Pressure boundary |
| Piping < 4” nps (includes RV flange leak-off lines) | Pressure boundary |
| Pressurizer penetration | Pressure boundary |
| Pressurizer shell and heads | Pressure boundary |
| Pressurizer spray head | Flow distribution |
| Pressurizer spray head coupling and locking bar | Structural support |
| Pump casing | Pressure boundary |
| Safe end | Pressure boundary |

### Table 2.3.1-3-IP2 (Continued)
### Reactor Coolant Pressure Boundary
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Support | Structural support |
| Support lug | Structural support |
| Support skirt | Structural support |
| Thermal sleeve | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body ≥ 4” nps | Pressure boundary |
| Valve body < 4” nps | Pressure boundary |

### Table 2.3.1-3-IP3
### Reactor Coolant Pressure Boundary
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bolting | Pressure boundary |
| Fittings (elbows, flanges, scoops, tees, etc.) | Pressure boundary |
| Flex hose | Pressure boundary |
| Heat exchanger (bonnet) | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Heater sheath | Pressure boundary |
| Heater wells | Pressure boundary |
| Manway cover | Pressure boundary |
| Manway insert plate | Pressure boundary |
| Nozzle | Pressure boundary |
| Orifice | Flow control<br>Pressure boundary |
| Piping ≥ 4” nps | Pressure boundary |
| Piping < 4” nps (includes RV flange leak-off lines) | Pressure boundary |
| Pressurizer penetration | Pressure boundary |
| Pressurizer shell and heads | Pressure boundary |
| Pressurizer spray head | Flow distribution |
| Pressurizer spray head coupling and locking bar | Structural support |
| Pump casing | Pressure boundary |

### Table 2.3.1-3-IP3 (Continued)
### Reactor Coolant Pressure Boundary
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Safe end | Pressure boundary |
| Support | Structural support |
| Support lug | Structural support |
| Support skirt | Structural support |
| Thermal sleeve | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body ≥ 4” nps | Pressure boundary |
| Valve body < 4” nps | Pressure boundary |

### Table 2.3.1-4-IP2
### Steam Generator
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| *Primary Side* | |
| Bolting (primary manway) | Pressure boundary |
| Channel (primary) head | Pressure boundary |
| Channel (primary) head divider plate | Pressure boundary |
| Primary nozzle | Pressure boundary |
| Primary nozzle safe end | Pressure boundary |
| Primary nozzle closure ring | Pressure boundary |
| Primary manway | Pressure boundary |
| Primary manway cover | Pressure boundary |
| Primary manway cover insert plate | Pressure boundary |
| Tubesheet | Pressure boundary |
| Tube | Heat transfer<br>Pressure boundary |
| Tube plug | Pressure boundary |
| *Secondary Side Externals* | |
| Bolting (secondary manway, handhole, and inspection port) | Pressure boundary |
| Shell (lower shell, upper shell, transition cone, elliptical upper head) | Pressure boundary |
| Feedwater nozzle | Pressure boundary |
| Steam outlet nozzle | Pressure boundary |
| Secondary manway (upper shell) | Pressure boundary |
| Secondary manway cover | Pressure boundary |

### Table 2.3.1-4-IP2 (Continued)
### Steam Generator
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Secondary handhole and inspection port, inspection port threaded plug | Pressure boundary |
| Secondary handhole and inspection port cover | Pressure boundary |
| Secondary shell drain connection | Pressure boundary |
| Instrument connections; steam drum pressure, narrow range water level, and wide range water level | Pressure boundary |
| Steam flow restrictor (inside main steam nozzle) | Flow control |
| Blowdown pipe connection (nozzle) | Pressure boundary |
| *Secondary Side Internals* | |
| Flow distribution baffle | Flow distribution |
| Tube bundle wrapper and cone assembly | Flow distribution |
| Tube bundle wrapper handhole plug assembly | Flow distribution |
| Tube support plate | Structural support |
| Tube support plate stayrod | Structural support |
| Tube support plate stayrod spacer pipe | Structural support |
| Tube support plate stayrod nut | Structural support |
| Tube support plate stayrod washer | Structural support |
| Anti-vibration bar and peripheral retaining ring | Structural support |
| Feedwater ring and fittings | Flow distribution |

## Table 2.3.1-4-IP2 (Continued)
## Steam Generator
## Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Feedwater ring J-nozzles | Flow distribution |
| Feedwater nozzle thermal sleeve | Pressure boundary |
| *Steam Generator Instrumentation* | |
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.1-4-IP3
## Steam Generator
## Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| *Primary Side* | |
| Bolting (primary manway) | Pressure boundary |
| Channel (primary) head | Pressure boundary |
| Channel (primary) head divider plate | Pressure boundary |
| Primary nozzle | Pressure boundary |
| Primary nozzle safe end | Pressure boundary |
| Primary nozzle closure ring | Pressure boundary |
| Primary manway | Pressure boundary |
| Primary manway cover | Pressure boundary |
| Primary manway cover insert plate | Pressure boundary |
| Tubesheet | Pressure boundary |
| Tube | Heat transfer<br>Pressure boundary |
| Tube plug | Pressure boundary |
| *Secondary Side Externals* | |
| Bolting (secondary manway, handhole, and inspection port) | Pressure boundary |
| Shell (lower shell, upper shell, transition cone, elliptical upper head) | Pressure boundary |
| Feedwater nozzle | Pressure boundary |
| Steam outlet nozzle | Pressure boundary |
| Secondary manway (upper shell) | Pressure boundary |
| Secondary manway cover | Pressure boundary |

### Table 2.3.1-4-IP3 (Continued)
### Steam Generator
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Secondary handhole and inspection port, inspection port threaded plug | Pressure boundary |
| Secondary handhole and inspection port cover | Pressure boundary |
| Secondary handhole cover RTD boss | Pressure boundary |
| Secondary handhole cover RTD well | Pressure boundary |
| Secondary shell drain connection | Pressure boundary |
| Instrument connections: steam drum pressure, narrow range water level, wide range water level, and sampling | Pressure boundary |
| Steam flow restrictor (inside main steam nozzle) | Flow control |
| Blowdown pipe connection (nozzle) | Pressure boundary |
| *Secondary Side Internals* | |
| Flow distribution baffle | Flow distribution |
| Tube bundle wrapper and cone assembly | Flow distribution |
| Tube bundle wrapper handhole plug assembly | Flow distribution |
| Tube support plate | Structural support |
| Tube support plate stayrod | Structural support |
| Tube support plate stayrod spacer pipe | Structural support |
| Tube support plate stayrod nut | Structural support |
| Tube support plate stayrod washer | Structural support |
| Anti-vibration bar | Structural support |

### Table 2.3.1-4-IP3 (Continued)
### Steam Generator
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Anti-vibration bar end caps and peripheral retaining ring | Structural support |
| Feedwater ring and fittings | Flow control |
| Feedwater ring J-nozzles | Flow control |
| Feedwater nozzle thermal sleeve | Pressure boundary |
| *Steam Generator Instrumentation* | |
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### 2.3.2 Engineered Safety Features

The engineered safety features are described in UFSAR Sections 5 and 6 for both Unit 2 and Unit 3.

The following systems are described in this section.

- Residual Heat Removal
- Containment Spray System
- Containment Isolation Support Systems
- Safety Injection Systems
- Containment Penetrations

### 2.3.2.1 Residual Heat Removal

System Description

*Unit 2*

The purpose of the residual heat removal (RHR) system is to provide emergency core cooling as part of the safety injection system and provide residual heat removal during later stages of plant cooldown. The RHR system is part of the auxiliary coolant systems that consist of the component cooling water system, the spent fuel pit cooling system and the RHR system. The RHR system consists of two RHR heat exchangers, two seal coolers, two RHR pumps and the required piping, valves, instrumentation and control components.

The RHR system is used to provide emergency core cooling during the injection phase of a loss-of-coolant accident (LOCA). The RHR heat exchangers in conjunction with the safety injection recirculation pumps are used for post-accident heat removal during the recirculation phase of a LOCA. Outlet flow from the RHR heat exchangers may be directed to the containment spray headers, to the RCS cold legs, or to the RCS hot legs via the high-head safety injection pumps. The RHR pumps also serve as a backup to the safety injection system recirculation pumps during the recirculation phase of a LOCA. In this capacity, the RHR pumps may draw water from the containment sump and deliver it to the RCS cold leg injection lines, to the suction of the high-head safety injection pumps, or to the containment spray headers.

The RHR system is used to provide residual heat removal during later stages of plant cooldown and during cold shutdown and refueling operations. After the reactor coolant system temperature and pressure have been reduced to 350°F and less than 365 psig, decay heat cooling is initiated by aligning the RHR pumps to take suction from one reactor hot leg and discharge through the RHR heat exchangers into the reactor cold legs.

The RHR system has the following intended functions for 10 CFR 54.4(a)(1).

- Maintain the RCS pressure boundary (function performed by Class 1 RCS components that are part of this system code in the database).
- Provide a borated water flow path from the refueling water storage tank (RWST) to the RCS cold leg via the RHR pumps.
- Provide a flow path via the RHR heat exchangers for the recirculation pumps to deliver spilled reactor coolant back to the reactor core and containment spray header.
- Provide a flow path from the containment sump for the RHR pumps to deliver spilled reactor coolant, via the RHR heat exchangers, back to the reactor core and containment spray header.
- Provide a flow path for the recirculation pumps or RHR pumps to deliver spilled reactor coolant, via the RHR heat exchangers, back to the reactor core through the high head safety injection pumps.

- Support an alternate flow path for the RHR pumps to deliver spilled reactor coolant to the suction of the safety injection pumps, bypassing the RHR heat exchangers (this supports a safety injection system function).
- Provide containment isolation capability for lines penetrating containment.

The RHR system has no intended function for 10 CFR 54.4(a)(2).

The RHR system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide long-term decay heat removal to support Appendix R safe shutdown (10 CFR 50.48) and station blackout (10 CFR 50.63).

*Unit 3*

The purpose of the residual heat removal system is to provide emergency core cooling as part of the safety injection system and provide residual heat removal during later stages of plant cooldown. The RHR system is part of the auxiliary coolant systems that consist of the component cooling water system, the spent fuel pit cooling system, and the RHR system. The RHR system consists of two RHR heat exchangers, two seal coolers, two RHR pumps and the required piping, valves, instrumentation and control components.

The RHR system is used to provide emergency core cooling during the injection phase of a loss-of-coolant accident (LOCA). The RHR heat exchangers in conjunction with the safety injection recirculation pumps are used for post-accident heat removal during the recirculation phase of a LOCA. Outlet flow from the RHR heat exchangers may be directed to the containment spray headers, to the RCS cold legs, or to the RCS hot legs via the high-head safety injection pumps. Additionally, RHR heat exchanger outlet flow may be directed to the suction of the high-head safety injection pumps or to the containment spray headers. The RHR pumps also serve as a backup to the safety injection system recirculation pumps during the recirculation phase of a LOCA. In this capacity, the RHR pumps may draw water from the containment sump and deliver it to the RCS cold leg injection lines, to the suction of the high-head safety injection pumps, or to the containment spray headers.

The RHR system is used to provide residual heat removal during later stages of plant cooldown, during cold shutdown and refueling operations. After the reactor coolant system temperature and pressure have been reduced to 350°F and less than 450 psig, decay heat cooling is initiated by aligning the RHR pumps to take suction from one reactor hot leg and discharge through the RHR heat exchangers into the reactor cold legs.

The RHR system has the following intended functions for 10 CFR 54.4(a)(1).

- Maintain the RCS pressure boundary (function performed by Class 1 RCS components that are part of this system code in the database).

- Provide a borated water flow path from the RWST to the RCS cold leg via the RHR pumps.
- Provide a flow path via the RHR heat exchangers for the recirculation pumps to deliver spilled reactor coolant back to the reactor core and containment spray header.
- Provide a flow path from the containment sump for the RHR pumps to deliver spilled reactor coolant, via the RHR heat exchangers, back to the reactor core and containment spray header.
- Provide a flow path for the recirculation pumps or RHR pumps to deliver spilled reactor coolant, via the RHR heat exchangers, back to the reactor core through the high head safety injection pumps.
- Support an alternate flow path for the RHR pumps to deliver spilled reactor coolant to the suction of the safety injection pumps, bypassing the RHR heat exchangers (this supports a safety injection system function).
- Provide containment isolation capability for lines penetrating containment.

The RHR system has no intended function for 10 CFR 54.4(a)(2).

The RHR system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide long-term decay heat removal to support Appendix R safe shutdown (10 CFR 50.48).

UFSAR References

Unit 2: Sections 6.2 and 9.3

Unit 3: Sections 6.2 and 9.3

Components Subject to Aging Management Review

*Unit 2*

ASME Class 1 components with the intended function of maintaining the reactor coolant pressure boundary are reviewed with the RCS (Section 2.3.1). A small number of components are reviewed with the safety injection system (Section 2.3.2.4). Remaining RHR components are reviewed as listed below.

*Unit 3*

ASME Class 1 components with the intended function of maintaining the reactor coolant pressure boundary are reviewed with the RCS (Section 2.3.1). A small number of components are reviewed with the component cooling water system (Section 2.3.3.3). Remaining RHR components are reviewed as listed below.

Table 2.3.2-1-IP2 and Table 2.3.2-1-IP3 list the component types that require aging management review.

Table 3.2.2-1-IP2 and Table 3.2.2-1-IP3 provide the results of the aging management review.

License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

| *Unit 2* | *Unit 3* |
|---|---|
| LRA-9321-2735 | LRA-9321-27513-001 |
| LRA-235296 | LRA-9321-27353 |
| LRA-9321-2745 | LRA-9321-27203 |
| LRA-9321-2720 | LRA-9321-27453 |
| LRA-251783 | LRA-9321-27503 |
|  | LRA-9321-27263 |

### 2.3.2.2 Containment Spray System

System Description

*Unit 2*

The purpose of the containment spray system is to provide containment cooling and iodine removal following an accident. The containment spray system consists of two trains of pumps, valves and spray headers that are designed to automatically start and spray borated water into the containment when high containment pressure is sensed following a LOCA or main steam line break accident. The containment spray system sprays a portion of the contents of the RWST into the containment atmosphere. The spray water enters containment through spray nozzles connected to four ring headers in the containment dome. Each spray pump supplies two ring headers. The containment spray pumps take their suction from the RWST. After injection from the RWST has been terminated, the spray headers can be supplied recirculated water from the recirculation sump or the containment sump by a diversion of a portion of the injection flow from the safety injection system.

Long-term post-accident retention of iodine is assured by four trisodium phosphate baskets located in the containment at an elevation (46') that will be flooded under accident conditions, allowing the trisodium phosphate to dissolve into the fluid for pH control. The four trisodium phosphate baskets are included in the containment structural evaluation (summarized in Section 2.4.1) but are not discussed further as they have no license renewal intended function and are therefore not subject to aging management review.

The containment spray system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide means for rapid reduction of containment pressure and temperature by providing borated water from the RWST following a design basis LOCA or a steam line break accident inside containment.
- Distribute flow from the containment recirculation pumps or RHR pumps to the containment atmosphere during the recirculation phase of an accident.
- Provide for chemical additives (trisodium phosphate) to increase the pH of post-accident fluids in the recirculation and containment sumps.
- Provide containment isolation capability for lines penetrating containment.

The containment spray system has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

*Unit 3*

The purpose of the containment spray system is to provide containment cooling and iodine removal following an accident. The containment spray system consists of two trains of pumps, valves and spray headers that are designed to automatically start and spray borated water into the containment when high containment pressure is sensed following a LOCA or main steam line break accident. The containment spray system sprays a portion of the contents of the RWST into the containment atmosphere. The spray water enters containment through spray nozzles connected to four ring headers in the containment dome. Each spray pump supplies two ring headers. The containment spray pumps take their suction from the RWST. After injection from the RWST has been terminated, the spray headers can be supplied recirculated water from the recirculation sump or the containment sump by a diversion of a portion of the injection flow from the safety injection system.

The containment spray system includes a spray additive tank containing sodium hydroxide and eductors that draw from the tank when the containment spray pumps are in operation following a LOCA for pH control of the water in containment. The containment spray system also includes a dousing system for the carbon filter bank of each fan cooler unit of the containment air recirculation cooling and filtration system. Each dousing system can be started manually if high temperature conditions occur.

The containment spray system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide means for rapid reduction of containment pressure and temperature by providing borated water from the RWST following a design basis loss-of-coolant accident (LOCA) or a steam-line-break accident inside containment.
- Distribute flow from the containment recirculation pumps or RHR pumps to the containment atmosphere during the recirculation phase of an accident.
- Provide a means to inject chemical spray additives (sodium hydroxide) into the containment spray stream to increase the pH of post-accident fluids in the recirculation and containment sumps.
- Provide containment isolation capability for lines penetrating containment.

The containment spray system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The containment spray system has the following intended function for 10 CFR 54.4(a)(3).

- Provide fire-dousing water to the containment recirculation fan carbon filter banks (10 CFR 50.48).

### UFSAR References

Unit 2: Section 6.3

Unit 3: Section 6.3

### Components Subject to Aging Management Review

Components in the CS systems that support the RHR system pressure boundary are evaluated with the RHR systems (Section 2.3.2.1). A small number of components are reviewed with the safety injection system (Section 2.3.2.4). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining CS components are reviewed as listed below.

Table 2.3.2-2-IP2 and Table 2.3.2-2-IP3 list the component types that require aging management review.

Table 3.2.2-2-IP2 and Table 3.2.2-2-IP3 provide the results of the aging management review.

### License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

LRA-A235296
LRA-9321-2735
LRA-9321-27503
LRA-9321-27353

### 2.3.2.3 Containment Isolation Support Systems

System Description

The containment isolation support systems (CISS) evaluation includes the isolation valve seal water systems (IVSWS) for both units and the weld channel and penetration pressurization systems (WCPS on Unit 2 and WCCPPS (weld channel and containment penetration pressurization system) on Unit 3). For Unit 3, this evaluation also includes the primary auxiliary building (PAB) system code, which has a containment penetration.

CISS consists of piping and valves routed to the various system piping that penetrates the containment. The IVSW, WCPS, and WCCPP systems support isolation of the containment from the outside environment for various systems whose piping penetrates containment.

CISS provides injection of fluid or air/gas into system lines in between the containment isolation valves penetrating the containment to ensure pressure boundary integrity against leakage of radioactive fluids to the environment in the event of a loss-of-coolant accident. These barriers, in the form of piping and isolation valves systems, are defined on an individual line basis. In addition to satisfying containment isolation criteria, the valving was designed to facilitate normal operation and maintenance of the systems and to ensure reliable operation of other engineered safeguards systems.

*Unit 2*

*IVSWS*

The purpose of the IVSWS is to provide sealing water or gas between the isolation valves and double disk isolation valves of containment penetrations. By providing a water seal (and in a few cases a gas seal) at the valves, the system ensures the effectiveness of those containment isolation valves that are located in lines connected to the reactor coolant system or that could be exposed to the containment atmosphere during any condition which requires containment isolation. This system operates to limit the fission product release from the containment. Although operation of the system is not credited in the post-accident dose analyses, the system provides assurance that the containment leak-rate in the event of an accident is lower than that assumed in the accident analysis and the offsite dose calculations. Components of the system form part of the containment penetration isolation boundary.

The IVSWS has the following intended function for 10 CFR 54.4(a)(1).

- Maintain the RCS pressure boundary (function performed by Class 1 RCS components that are part of this system code in the database).
- Inject pressurized seal water to containment isolation valves in the lines which are either connected to the reactor coolant system or could be exposed to containment pressure.

- Supply nitrogen to containment penetration lines that are connected to the reactor coolant system and are subjected to pressure in excess of the water portion of the isolation valve seal water system design pressure.
- Provide containment isolation capability for components that are part of containment penetrations.

The IVSWS has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

*WCPS*

The purpose of the WCPS is to provide pressurized gas to all containment penetrations and most liner inner weld seams such that in the event of a LOCA, there would be no leakage through these potential leakage paths from the containment to the atmosphere. Spaces between selected isolation valves are also served by the WCPS. Although operation of the system is not credited in the post-accident dose analyses, by maintaining the WCPS at some pressure level above the peak accident pressure, any postulated leakage would be into the containment rather than out of the containment. A regulated supply of clean and dry compressed air from either of the plant's compressed air systems located outside the containment is supplied to all containment penetrations and most inner liner weld channels. The primary source of air for this system is the instrument air system. The station air system acts as a backup to the instrument and control air system. A standby source of gas pressure for the system is provided by a bank of nitrogen cylinders.

The WCPS has the following intended functions for 10 CFR 54.4(a)(1).

- Provide pressurized air or nitrogen above the accident containment pressure to containment penetrations, weld channel joints, some containment isolation valves, airlock seals, and fuel transfer tube flange gaskets to minimize vapor containment post-accident leakage to the environment.
- Provide containment isolation capability for lines penetrating containment.

The WCPS has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

*Unit 3*

*IVSW*

The purpose of the IVSW system is to provide sealing water or gas between the isolation valves and double disk isolation valves of containment penetrations. By providing a water seal (and in a few cases a gas seal) at the valves, the system ensures the effectiveness of those containment isolation valves that are located in lines connected to the reactor coolant system or that could be exposed to the containment atmosphere during any condition which requires containment isolation. This system operates to limit the fission product release from the containment.

Although operation of the system is not credited in the post-accident dose analyses, the system provides assurance that the containment leak-rate in the event of an accident is lower than that assumed in the accident analysis and the offsite dose calculations. Components of the system form part of the containment penetration isolation boundary.

The IVSW system has the following intended functions for 10 CFR 54.4(a)(1).

- Maintain the RCS pressure boundary (function performed by Class 1 RCS components that are part of this system code in the database).
- Inject pressurized seal water to containment isolation valves in the lines which are either connected to the reactor coolant system or could be exposed to containment pressure.
- Supply nitrogen to containment penetration lines that are connected to the reactor coolant system and are subjected to pressure in excess of the water portion of the isolation valve seal water system design pressure in the event of an accident.
- Provide containment isolation capability for components that are part of containment penetrations.

The IVSW system has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

*WCCPPS*

The purpose of the WCCPPS is to provide pressurized gas to all containment penetrations and most liner inner weld seams such that in the event of a LOCA, there would be no leakage through these potential leakage paths from the containment to the atmosphere. Spaces between selected isolation valves are also served by the WCCPPS. Although operation of the system is not credited in the post-accident dose analyses, by maintaining the WCCPPS at some pressure level above the peak accident pressure, any postulated leakage would be into the containment rather than out of the containment. A regulated supply of clean and dry compressed air from either of the plant's compressed air systems located outside the containment is supplied to all containment penetrations and most inner liner weld channels. The primary source of air for this system is the instrument air system. The station air system acts as a backup to the instrument and control air system. A standby source of gas pressure for the system is provided by a bank of nitrogen cylinders.

The WCCPPS has the following intended functions for 10 CFR 54.4(a)(1).

- Provide pressurized air above peak accident pressure to all containment penetrations, most liner inner weld seams, and the spaces between some isolation valves to minimize vapor containment post-accident leakage to the environment.
- Provide containment isolation capability for lines penetrating containment.
- Provide automatic transfer to supply nitrogen from the nitrogen storage assembly upon receipt of a low pressure signal from the WCCPP air receivers.

The WCCPPS has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The WCCPPS has no intended function for 10 CFR 54.4(a)(3).

*PAB*

The purpose of the primary auxiliary building (PAB) is to house and protect emergency safeguards equipment and other systems supporting the safe operation of the reactor. This system code is primarily for structural use, but, because it also includes the guard pipe and enclosure mini-containment leakage boundary for a containment sump penetration, the system has a mechanical intended function and is discussed here. This enclosure (tank) provides a second leakage boundary for the primary containment penetration from the containment sump.

The PAB system has the following intended function for 10 CFR 54.4(a)(1).

- Provide guard pipe and enclosure mini-containment leakage boundary for containment sump penetration.

The PAB system has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

UFSAR References

| *Unit 2* | | *Unit 3* | |
|---|---|---|---|
| IVSWS | Section 6.5.1 | IVSWS | Section 6.5 |
| WCPS | Sections 6.6.2 and 14.3.6.1 | WCCPPS | Section 6.6 |
| | | PAB | Section 6.2.2 |

Components Subject to Aging Management Review

IVSWS components with the intended function of maintaining the reactor coolant pressure boundary are reviewed with the RCS (Section 2.3.1.3). Nonsafety-related portions of the Unit 3 WCCPPS not evaluated with other systems that have the potential to prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining CISS components are reviewed as listed below.

Table 2.3.2-3-IP2 and Table 2.3.2-3-IP3 list the component types that require aging management review.

Table 3.2.2-3-IP2 and Table 3.2.2-3-IP3 provide the results of the aging management review.

License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

LRA-9321-F-2726
LRA-9321-F-27263
LRA-9321-F-2746
LRA-9321-F-27463
LRA-9321-F-2025
LRA-9321-F-7052
LRA-9321-F-4022
LRA-9321-F-26533

### 2.3.2.4 Safety Injection Systems

System Description

*Unit 2*

The primary purpose of the safety injection (SI) system is the automatic delivery of cooling water to the reactor core in the event of a loss-of-coolant accident. This limits the fuel clad temperature and thereby ensures that the core will remain intact and in place, with its essential heat transfer geometry preserved. Components comprising the SI system code include the refueling water storage tank, the three safety injection (high-head) pumps, the accumulators (one for each loop), recirculation pumps and piping, valves, and other components associated with these subsystems.

The three safety injection (high-head) pumps inject borated water stored in the RWST into the RCS to provide core cooling. The safety injection signal automatically opens the required safety injection system isolation valves and starts the safety injection pumps.

The accumulators contain borated water pressurized with nitrogen and are connected to the RCS by injection piping and valves. Two check valves isolate these tanks from the RCS during normal operation. When RCS pressure falls below accumulator pressure, the check valves open, discharging the contents of the tanks into the RCS through the same injection piping used by the safety injection pumps.

After the injection operation, coolant spilled from the break and water collected from the containment spray are cooled and returned to the reactor coolant system by the recirculation system. The system is arranged so that the recirculation pumps take suction from the recirculation sump in the containment floor and deliver spilled reactor coolant and borated refueling water back to the core through the residual heat removal heat exchangers. For smaller breaks in the reactor coolant system where recirculated water must be injected against higher pressures for long-term cooling, the system is arranged to deliver the water from a residual heat removal heat exchanger to the high-head safety injection pump suction and by this external recirculation route to the reactor coolant loops. The system is also arranged to allow either of the residual heat removal pumps to take over the recirculation function (see Section 2.3.2.1).

The SI system has the following intended functions for 10 CFR 54.4(a)(1).

- Maintain the RCS pressure boundary (function performed by Class 1 RCS components that are part of this system code in the database).
- Provide a flow path from the RWST to supply borated water to the RCS via the SI pumps to the cold legs.
- Provide a water source from the RWST to supply borated water to the suction of the containment spray pumps.

- Provide a flow path to inject borated water from the SI accumulators to the core via the RCS cold legs.
- Provide a flow path for the recirculation pumps to inject borated water, via the RHR heat exchangers, to the RCS cold legs and containment spray header.
- Provide an alternate flow path from the containment sump for the RHR pumps to deliver reactor coolant, via the RHR heat exchangers, back to the reactor core and containment spray header.
- Provide capability for the recirculation pumps or RHR pumps to deliver reactor coolant, via the RHR heat exchangers, back to the RCS cold and/or hot legs through the high head safety injection pumps.
- Provide an alternate flow path, in the event a failure of the normal SI pump suction line from the RHR heat exchanger, for the RHR pumps to deliver reactor coolant to a high-head safety injection pump, bypassing the RHR heat exchangers.
- Provide a flow path from containment to containment pressure sensing instruments.
- Provide containment isolation capability for lines penetrating containment.

The SI system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The SI system has the following intended function for 10 CFR 54.4(a)(3).

- Provide a borated water source to the charging pumps and support isolation of components to maintain RCS inventory control to support Appendix R Safe Shutdown (10 CFR 50.48).

### _Unit 3_

#### *SI System*

The primary purpose of the SI system is the automatic delivery of cooling water to the reactor core in the event of a loss-of-coolant accident. This limits the fuel clad temperature and thereby ensures that the core will remain intact and in place, with its essential heat transfer geometry preserved. Components comprising the SI system code include the refueling water storage tank, three safety injection (high-head) pumps, accumulators (one for each loop), recirculation pumps and piping, valves, and other components associated with these subsystems.

The three safety injection (high-head) pumps are designed to inject borated water stored in the RWST into the RCS to provide core cooling. The safety injection signal automatically opens the required safety injection system isolation valves and starts the safety injection pumps.

The accumulators contain borated water pressurized with nitrogen and are connected to the RCS by injection piping and valves. Two check valves isolate these tanks from the RCS during normal operation. When RCS pressure falls below accumulator pressure, the check valves open, discharging the contents of the tanks into the RCS through the same injection piping used by the safety injection pumps.

After the injection operation, coolant spilled from the break and water collected from the containment spray are cooled and returned to the reactor coolant system by the recirculation system. The system is arranged so that the recirculation pumps take suction from the recirculation sump in the containment floor and deliver spilled reactor coolant and borated refueling water back to the core through the residual heat exchangers. For the smaller breaks in the reactor coolant system where recirculated water must be injected against higher pressures for long-term cooling, the system is arranged to deliver the water from a residual heat removal heat exchanger to the high-head safety injection pump suction and by this external recirculation route to the reactor coolant loops. The system is also arranged to allow either of the residual heat removal pumps to take over the recirculation function.

The SI system has the following intended functions for 10 CFR 54.4(a)(1).

- Maintain the RCS pressure boundary (function performed by Class 1 RCS components that are part of this system code in the database).
- Provide a flow path from the RWST to supply borated water to the RCS via the SI pumps to the cold legs.
- Provide a water source from the RWST to supply borated water to the suction of the containment spray pumps.
- Provide a flow path to inject borated water from the SI accumulators to the core via the RCS cold legs.
- Provide a flow path for the recirculation pumps to inject borated water to the RCS cold legs.
- Provide a flow path from the recirculation sump to the RHR heat exchangers and the containment spray header.
- Provide an alternate flow path from the containment sump for the RHR pumps to deliver reactor coolant, via the RHR heat exchangers, back to the reactor core and containment spray header.
- Provide a flow path to inject borated water from the recirculation sump through the RHR heat exchangers to the RCS cold legs via the SI pumps.
- Provide a flow path to inject borated water through the RHR heat exchangers then via the SI pumps to the RCS hot legs.
- Provide containment isolation capability for lines penetrating containment.
- Provide nitrogen supply from SI accumulators to the nitrogen supply line to the pressurizer power-operated relief valves (PORVs) during an RCS over-pressurization event.

- Provide alternate flow path from containment sump via RHR pumps to a high-head safety injection pump in response to passive failures in the normal high-head SI suction flow path.

The SI system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The SI system has the following intended function for 10 CFR 54.4(a)(3).

- Supply water from the RWST as makeup water for the RCS and support isolation of components to maintain RCS inventory control following a fire (10 CFR 50.48).

*Engineered Safeguards Initiation Logic*

The engineered safeguards initiation logic (ESS) system is evaluated with the SI system.

The purpose of the ESS system is to actuate the engineered safety features. The system actuates (depending on the severity of the condition) the safety injection system, the containment isolation system, the containment air recirculation system, and the containment spray system. The ESS system is primarily an electrical system; however, it does include some mechanical components, specifically the piping and valves from the containment to the containment pressure transmitters, and therefore has the following mechanical intended function.

The ESS system has the following intended function for 10 CFR 54.4(a)(1).

- Maintain containment integrity and provide a flowpath to the containment pressure transmitters.

The ESS system has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

UFSAR References

Unit 2: Section 6.2

Unit 3: Safety injection, Section 6.2; ESS, Section 7.2

## Components Subject to Aging Management Review

### *Unit 2 and Unit 3*

ASME Class 1 components with the intended function of maintaining the reactor coolant pressure boundary are reviewed with the RCS (Section 2.3.1.3). A small number of components are reviewed with the containment spray system (Section 2.3.2.2), residual heat removal systems (Section 2.3.2.1) or nitrogen systems (Section 2.3.3.5). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining SI and ESS components are reviewed as listed below.

Table 2.3.2-4-IP2 and Table 2.3.2-4-IP3 list the component types that require aging management review.

Table 3.2.2-4-IP2 and Table 3.2.2-4-IP3 provide the results of the aging management review.

## License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

| *Unit 2* | *Unit 3* |
|---|---|
| LRA-9321-2720 | LRA-9321-27203 |
| LRA-9321-2735 | LRA-9321-27353 |
| LRA-9321-2745 | LRA-9321-27453 |
| LRA-227781 | LRA-9321-27503 |
| LRA-235296 | LRA-9321-27513, sheet 1 |
| LRA-251783 | LRA-9321-27513, sheet 2 |

### 2.3.2.5 Containment Penetrations

System Description

Containment penetrations is not an independent system but is a grouping of containment penetration components not evaluated with other systems. Mechanical penetrations for systems with a system-level aging management review are evaluated with that system. The scope of this evaluation is passive mechanical penetration components not included in other system evaluations. This evaluation includes only the containment penetration portion of these systems.

The grouping of containment isolation valves from various plant systems into one consolidated review is appropriate, as stated in NUREG-1800, *Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants*, Section 2.1.3.1.

Containment penetrations have the following intended function for 10CFR54.4(a)(1).

- Prevent release of radioactivity to outside environment.

Containment penetrations have no intended functions for 10CFR54.4(a)(2) or (a)(3).

The following systems are described in this section because their only intended function is performed by a containment penetration.

*Unit 2*

*Electrical Penetrations*

The purpose of electrical penetrations is to provide a means of passing electrical conductors through the containment boundary. The electrical penetrations (EP) system code is primarily composed of structural and electrical components that are evaluated in the structural and electrical aging management reviews; however, the system contains mechanical components that are evaluated here. The penetrations are provided with a pressure connection to allow continuous pressurization by the weld channel system. This is considered part of the containment isolation boundary.

The EP system has the following intended function for 10 CFR 54.4(a)(1).

- Support the containment isolation boundary.

The EP system has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

### *Fuel Core Component Handling System*

The purpose of the fuel core component handling (FCCH) system is to provide the ability to defuel and refuel the reactor core. The fuel handling system provides a safe effective means of transporting and handling fuel. Most of the system components (e.g., fuel handling bridges) are structural components evaluated with their respective structures. The fuel transfer tube and blind flange are components in the FCCH system and together constitute a containment penetration.

The FCCH system has the following intended function for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for transfer line penetrating containment.

The FCCH system has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

### *Hydrogen Recombiners*

The purpose of the hydrogen recombiners (HR system) is to reduce the hydrogen concentration in the containment volume following a design basis accident. The system includes two redundant passive autocatalytic recombiners that replaced earlier flame units. The recombiners are passive devices: they contain no moving parts and do not need electrical power or any other support system. Recombination is accomplished by the attraction of oxygen and hydrogen molecules to the surface of a palladium catalyst. The exothermic reaction of the combination produces heat, which results in a convective flow that draws more gases from the containment atmosphere into the unit. Based on a recent license amendment (Amendment No. 243), hydrogen recombination is no longer required as a safety function.

The system includes containment penetrations from the original flame hydrogen recombiners.

The HR system has the following intended function for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.

The HR system has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

## *Unit 3*

### *Building Vent Sampling*

The purpose of the building vent sampling (BVS) system is to draw samples from the building ventilation to determine radioactive gasses that may be present. This provides indication that verifies the plant radioactive gaseous effluents are within the Technical Specification limits. The system includes several containment penetrations and provides a flow path to two process radiation monitors.

The BVS system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.
- Provide a process flow path to radiation monitors.

The BVS system has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

*Fuel Handling*

The purpose of the fuel handling (FHS) system is to provide the ability to defuel and refuel the reactor core. The fuel handling system provides a safe effective means of transporting and handling fuel. The majority of the components shown in the database and the fuel storage racks and pools are structural components and covered in the structural evaluations. The fuel transfer tube blind flange is included in this system code and is a passive mechanical component for that containment penetration.

The FHS has the following intended function for 10 CFR 54.4(a)(1).

- Provide containment isolation capability via the fuel transfer tube blind flange.

The FHS has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

*Integrated Leak Rate Testing*

The purpose of the integrated leak rate testing (ILRT) system is to support containment integrated leak rate testing during shutdown conditions. The system includes the piping, valves and equipment used to pressurize containment and the instrumentation used to monitor containment parameters during the test. The system includes containment penetrations that are isolated by blind flanges during normal operation.

The ILRT system has the following intended function for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.

The ILRT system has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

## UFSAR References

| *Unit 2* | | *Unit 3* | |
|---|---|---|---|
| containment penetrations | Section 5.1.4 | containment penetrations | Section 5.1.4 |
| EP | Section 5.1.4.2.1 | BVS | Sections 9.4.2 and 11.2 |
| FCCH | Section 9.5.2 | | |
| HR | Section 6.8 | FHS | Sections 1.2.2 and 9.5 |
| | | ILRT | None |

## Components Subject to Aging Management Review

Components in the containment penetrations evaluated in this section are those that maintain the pressure boundary of the system inside containment from the first weld from the penetration to the class boundary change outside containment. Components in the Class 1 boundary are evaluated with the reactor coolant pressure boundary (Section 2.3.1.3). Structural portions of the containment penetrations are evaluated with the containment building (Section 2.4.1). Electrical portions of electrical penetration assemblies are evaluated with electrical components (Section 2.5). Containment penetrations not included in other systems' aging management reviews are reviewed as listed below. This review includes the BVS system process flow path to the radiation monitors.

Table 2.3.2-5-IP2 and Table 2.3.2-5-IP3 list the component types that require aging management review.

Table 3.2.2-5-IP2 and Table 3.2.2-5-IP3 provide the results of the aging management review.

## License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

*Unit 2*
LRA-9321-2027
LRA-9321-2727
LRA-9321-2750
LRA-9321-2025
LRA-208879
LRA-208479

*Unit 2*
LRA-9321-72043
LRA-9321-2726
LRA-227178
LRA-238106

*Unit 3*
LRA-9321-70453
LRA-9321-27503
LRA-9321-27473
LRA-9321-27783
LRA-9321-20253
LRA-24043

*Unit 3*
LRA-9321-26533

### Table 2.3.2-1-IP2
### Residual Heat Removal System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flex hose | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary<br>Flow control |

### Table 2.3.2-1-IP3
### Residual Heat Removal System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Strainer housing | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary<br>Flow control |

## Table 2.3.2-2-IP2
## Containment Spray System
## Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Pressure boundary |
| Nozzle | Pressure boundary<br>Flow control |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary<br>Flow control |

### Table 2.3.2-2-IP3
### Containment Spray System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Eductor | Pressure boundary<br>Flow control |
| Flow element | Pressure boundary |
| Nozzle | Pressure boundary<br>Flow control |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.2-3-IP2
## Containment Isolation Support System
## Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Flow control<br>Pressure boundary |
| Indicator | Pressure boundary |
| Instrument | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.2-3-IP3
### Containment Isolation Support System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Filter | Filtration |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary<br>Flow control |
| Indicator | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.2-4-IP2
### Safety Injection Systems
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Pressure boundary<br>Flow control |
| Heat exchanger (bonnet) | Pressure boundary |
| Heat exchanger (housing) | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Heat exchanger (tubesheet) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Seal jacket cooler | Heat transfer<br>Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.2-4-IP3
## Safety Injection Systems
## Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Pressure boundary<br>Flow control |
| Heat exchanger (bonnet) | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Heat exchanger (tubesheet) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Seal jacket cooler | Heat transfer<br>Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.2-5-IP2
## Containment Penetrations
## Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Regulator | Pressure boundary |
| Sampler housing | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

# Table 2.3.2-5-IP3
# Containment Penetrations
# Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### 2.3.3 Auxiliary Systems

The following systems are described in this section.

- Spent Fuel Pit Cooling
- Service Water
- Component Cooling Water
- Compressed Air
- Nitrogen Systems
- Chemical and Volume Control
- Primary Water Makeup
- Heating, Ventilation and Air Conditioning
- Containment Cooling and Filtration
- Control Room Heating, Ventilation and Cooling
- Fire Protection – Water
- Fire Protection – CO2, Halon, and RCP Oil Collection Systems
- Fuel Oil
- Emergency Diesel Generators
- Security Generators
- Appendix R Diesel Generators
- City Water
- Plant Drains
- Miscellaneous Systems in Scope for (a)(2)

### 2.3.3.1 Spent Fuel Pit Cooling

System Description

*Unit 2*

The purpose of the spent fuel pit cooling (SFPC) system is to maintain the spent fuel in a safe storage configuration and to remove heat generated by stored spent fuel elements from the spent fuel pit. The spent fuel pit cooling loop consists of two pumps, a heat exchanger, filter, demineralizer, piping, and associated valves and instrumentation. One of the pumps draws water from the pit, circulates it through the heat exchanger and returns it to the pit. Component cooling water (CCW) cools the heat exchanger. Loop piping is so arranged that the failure of any pipeline does not drain the spent fuel pit below the top of the stored fuel elements. The spent fuel pit pump suction line, which is used to draw water from the pit, penetrates the spent fuel pit wall above the fuel assemblies. The system also includes the spent fuel pit.

The spent fuel storage racks provide a storage location at the bottom of the spent fuel storage pit for spent fuel assemblies. The racks are full length, top entry type. The spent fuel storage racks are made of stainless steel with Boraflex as a neutron absorber.

The SFPC system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide pressure boundary capability for the CCW system within the spent fuel heat exchanger.
- Provide criticality protection. This function is performed by Boraflex plates in the pit racks.

The SFPC system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The SFPC system has no intended functions for 10 CFR 54.4(a)(3).

*Unit 3*

The purpose of the spent fuel pit cooling loop is to maintain the spent fuel in a safe storage configuration and to remove residual heat from fuel stored in the spent fuel pit. The spent fuel pit cooling loop consists of pumps (main and standby), heat exchanger, filters, demineralizer, piping, and associated valves and instrumentation. The operating pump draws water from the pit, circulates it through the heat exchanger and returns it to the pit. Component cooling water cools the heat exchanger, which forms part of the CCW system pressure boundary. Loop piping is so arranged that the failure of any pipeline does not drain the spent fuel pit below the top of the stored fuel elements. The spent fuel pit pump suction line, which is used to draw water from the pit, penetrates the spent fuel pit wall above the fuel assemblies. A purification loop is used to circulate spent fuel pit water through the demineralizer and filter for purification. A portion of the system piping supporting the RWST purification loop using the spent fuel pit demineralizer forms part of the safety injection (SI) system pressure boundary. The system also includes the spent fuel pit.

The spent fuel storage racks provide a storage location at the bottom of the spent fuel storage pit for spent fuel assemblies. The racks are full length, top entry type. The spent fuel storage racks are made of stainless steel with Boral as a neutron absorber.

The SFPC system has the following intended functions for 10 CFR 54.4(a)(1).

- Support the pressure boundary of the CCW and SI systems.
- Provide criticality protection. This function is performed by Boral plates in the pool racks.

The SFPC system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The SFPC system has no intended functions for 10 CFR 54.4(a)(3).

UFSAR References

Unit 2: Sections 9.3.1, 9.5.2.1.5 and 14.2.1

Unit 3: Sections 9.3 and 9.5

Components Subject to Aging Management Review

*Unit 2*

The spent fuel pit (including liner and the spent fuel racks) are included in the evaluation of the fuel storage buildings (Section 2.4.3). The heat exchanger components forming part of the CCW system pressure boundary are evaluated with the component cooling water systems (Section 2.3.3.3). A small number of components are evaluated with the primary makeup water systems (Section 2.3.3.7). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining Unit 2 SFPC components (Boraflex plates) are reviewed as listed below.

*Unit 3*

The pit and the spent fuel racks are included in the evaluation of the fuel storage buildings (Section 2.4.3). Components supporting the pressure boundary of the CCW system are evaluated with the component cooling water systems (Section 2.3.3.3). Components supporting the pressure boundary of the SI system are evaluated with the safety injection systems (Section 2.3.2.4). A small number of components are evaluated with the primary makeup water systems (Section 2.3.3.7). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining Unit 3 SFPC components (Boral plates) are reviewed as listed below.

Table 2.3.3-1-IP2 and Table 2.3.3-1-IP3 list the component types that require aging management review.

Table 3.3.2-1-IP2 and Table 3.3.2-1-IP3 provide the results of the aging management review.

License Renewal Drawings

The neutron absorption panels do not appear on a flow diagram; however, the LRA drawings most closely associated with the spent fuel pit are listed below.

| *Unit 2* | *Unit 3* |
|---|---|
| LRA-9321-2720-0 | LRA-9321-27513-002-0 |

### 2.3.3.2 Service Water

System Description

*Unit 2*

The purpose of the service water system (SWS) is to supply cooling water from the Hudson River to various heat loads in both the primary and secondary portions of the plant. Provision was made to ensure a continuous flow of cooling water to those systems and components necessary for plant safety either during normal operation or under abnormal or accident conditions. Sufficient redundancy of active and passive components was provided to ensure that short and long term cooling is maintained to vital loads in accordance with the single failure criteria.

Six identical, vertical, centrifugal sump-type pumps located at the intake structure supply service water to two independent discharge headers. Each header is supplied by three pumps. An automatic, self-cleaning, rotary-type strainer is in the discharge of each pump to remove solids. Each header is connected to an independent supply line. Either of the two supply lines can be used to supply the essential loads, with the other line feeding the nonessential loads. The essential loads are those which must have an assured supply of cooling water in the event of a loss of offsite power and/or a loss-of-coolant accident. The nonessential loads are those which are supplied with cooling water by manually starting a service water pump when required following a loss-of-coolant accident.

Nonessential loads include component cooling water heat exchangers, circulating water pump seal injection, turbine building closed cooling water system, hydrogen coolers, stator cooling water heat exchanger, exciter air coolers, and the isolated phase bus heat exchangers. The system also provides backup water for cleaning the traveling screens.

The SWS has the following intended functions for 10 CFR 54.4(a)(1).

- Provide cooling water from the Hudson River through the service water system essential header for the removal of heat from safety-related components.
- Provide cooling water from the Hudson River through the service water system nonessential header to cool the component cooling system.
- Provide water from the Hudson River to the service water strainers at the discharge of each SW Pump.
- Provide containment isolation capability for lines penetrating containment.

The SWS has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The SWS has the following intended functions for 10 CFR 54.4(a)(3).

- Provide cooling water during a plant cooldown for station blackout (10 CFR 50.63).
- Provide cooling water to essential loads to achieve safe shutdown following a postulated Appendix R fire (10 CFR 50.48).
- Support safe shutdown in the event of a fire in the auxiliary feed pump room (10 CFR 50.48) (see Section 2.3.4.5).

*Unit 3*

The purpose of the service water system (SWS) is to supply cooling water from the Hudson River to various heat loads in both the primary and secondary portions of the plant. Provision was made to ensure a continuous flow of cooling water to those systems and components necessary for plant safety either during normal operation or under abnormal or accident conditions. Sufficient redundancy of active and passive components was provided to ensure that short and long term cooling is maintained to vital loads in accordance with the single failure criteria.

Six identical, vertical, centrifugal sump-type pumps located at the intake structure supply service water to two independent discharge headers. Each header is supplied by three pumps. An automatic, self-cleaning, rotary-type strainer is in the discharge of each pump to remove solids. Each header is connected to an independent supply line. Either of the two supply lines can be used to supply the essential loads, with the other line feeding the nonessential loads.

A backup supply to the SWS can be provided by three non-seismic class pumps. These pumps are independent of the intake structure and draw a suction from the discharge canal. One of these non-seismic class pumps is credited with supplying service water during a safe shutdown following a fire.

The service water system provides cooling water to nonessential loads to support normal operation, including SG blowdown heat exchangers, circulating water pump seal coolers, turbine building closed cooling water system, hydrogen coolers, exciter air coolers and the isolated phase bus heat exchangers.

The SWS has the following intended functions for 10 CFR 54.4(a)(1).

- Provide cooling water to engineered safety features (ESF) equipment and components required to mitigate the consequences of accidents and maintain containment integrity, including emergency diesel generators, containment fan cooling units, the control room air conditioning condenser and CCW heat exchangers.
- Provide the capability to limit/isolate flow to various essential and nonessential loads under accident conditions.
- Provide containment isolation capability for lines penetrating containment.

- Provide the capability to realign system flow during changeover from the injection to recirculation phase following a LOCA.

The SWS has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The SWS has the following intended function for 10 CFR 54.4(a)(3).

- Provide cooling water to essential loads to achieve safe shutdown following a postulated Appendix R fire (10 CFR 50.48).

UFSAR References

Unit 2: Section 9.6.1

Unit 3: Section 9.6.1

Components Subject to Aging Management Review

*Unit 2*

Components that support safe shutdown in the event of a fire in the auxiliary feed pump room are evaluated in Section 2.3.4.5. Components cooling the CCW systems are evaluated with the component cooling water systems (Section 2.3.3.3). Components cooling the EDG systems are evaluated with the emergency diesel generator systems (Section 2.3.3.14). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining SWS components are reviewed as listed below.

*Unit 3*

Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining SWS components are reviewed as listed below.

Table 2.3.3-2-IP2 and Table 2.3.3-2-IP3 list the component types that require aging management review.

Table 3.3.2-2-IP2 and Table 3.3.2-2-IP3 provide the results of the aging management review.

## License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

*Unit 2*

LRA-9321-2028
LRA-9321-2722
LRA-209762
LRA-235117
LRA-235122
LRA-226037
LRA-226038
LRA-242687

*Unit 3*

LRA-9321-20283
LRA-9321-20333-001
LRA-9321-27223

### 2.3.3.3 Component Cooling Water

<u>System Description</u>

*<u>Unit 2</u>*

The purpose of the component cooling water (CCW) system is to remove residual and sensible heat from the reactor coolant system via the residual heat removal loop during plant shutdown, cool the letdown flow to the chemical and volume control system during power operation, and provide cooling to dissipate waste heat from various primary plant components. It also provides cooling for engineered safeguards and safe shutdown components. The system includes the pumps, heat exchangers, distribution and return piping and valves, instruments and controls to provide cooling to the following.

- RHR exchangers
- reactor coolant pumps
- non-regenerative heat exchanger
- excess letdown heat exchanger
- chemistry and volume control system (CVCS) seal-water heat exchanger
- sample heat exchangers
- waste gas compressors
- reactor vessel support pads
- residual heat removal pumps
- safety injection pumps
- recirculation pumps
- spent fuel pit heat exchanger
- charging pumps, fluid drive coolers, and crankcase

Some of the CCW-cooled heat exchangers in other systems have no safety function. However, these nonsafety-related heat exchangers form part of the CCW system pressure boundary. These heat exchangers have been included in scope with an intended function to maintain the pressure boundary but not to transfer heat.

The Unit 2 CCW system was not originally designed to accommodate a passive failure (not a design consideration during initial construction of Unit 2). The subsequent consideration of a passive failure required commitments for alternate cooling water supplies to safety-related equipment. Connections to primary and city water provide the alternate supplies.

The CCW system has the following intended functions for 10 CFR 54.4(a)(1)

- Provide cooling water to engineered safety features equipment.
- Provide cooling water from the component cooling water pumps to the recirculation pump motor coolers post-LOCA.

- Provide pressure boundary function for entire system to ensure component cooling can be provided to safety-related loads.
- Provide capability to connect emergency back-up cooling water (city water or primary water) to the charging, residual heat removal, and high head safety injection pumps.
- Provide containment isolation capability for lines penetrating containment.

The CCW system has no intended functions for 10 CFR 54.4(a)(2).

The CCW system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide capability to connect city water to the charging pumps for fire protection (10 CFR 50.48).
- The CCW system is credited in the Appendix R safe shutdown analysis for fire protection (10 CFR 50.48).
- The CCW is credited with operation during the plant cooldown portion of the SBO event (10 CFR 50.63).

*Unit 3*

The purpose of the CCW system is to remove residual and sensible heat from the reactor coolant system via the residual heat removal loop during plant shutdown, cool the letdown flow to the chemical and volume control system during power operation, and provide cooling to dissipate waste heat from various primary plant components in the primary auxiliary building and the containment building. It also provides cooling for engineered safeguards and safe shutdown components. The system includes the pumps, heat exchangers, distribution and return piping and valves, instruments and controls to provide cooling to the following.

- RHR heat exchangers
- reactor coolant pumps
- non-regenerative heat exchanger
- excess letdown heat exchanger
- CVCS seal water heat exchanger
- sample heat exchangers
- waste gas compressors
- reactor vessel support pads
- residual heat removal pumps
- safety injection pumps
- recirculation pumps
- spent fuel pit heat exchanger
- charging pumps, fluid drive coolers, and crankcase
- gross failed fuel detector

Some of the CCW-cooled heat exchangers in other systems have no safety function. However, these nonsafety-related heat exchangers form part of the CCW system pressure boundary. These heat exchangers have been included in scope with an intended function to maintain the pressure boundary but not to transfer heat. The heat exchangers within the CCW system are safety-related components.

The CCW system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide cooling water to engineered safety features equipment.
- Provide cooling water from the auxiliary component cooling water pumps to the recirculation pump motor coolers post-LOCA.
- Provide containment isolation capability for lines penetrating containment.
- Provide cooling water to gross failed fuel monitor and reactor coolant sample heat exchangers.

The CCW system has no intended functions for 10 CFR 54.4(a)(2).

The CCW system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide cooling water to the charging pump oil coolers and RCP thermal barrier coolers following a fire (10 CFR 50.48).

### UFSAR References

Unit 2: Sections 9.3 and 6.2.2.3.4

Unit 3: Section 9.3

### Components Subject to Aging Management Review

#### *Unit 2*

A few components assigned the CCW system code support the RHR system pressure boundary and are therefore evaluated with the residual heat removal systems (Section 2.3.2.1). Components providing cooling to the SI systems are evaluated with the safety injection systems (Section 2.3.2.4). Components providing cooling to the CVCS systems are evaluated with the chemical and volume control systems (Section 2.3.3.6). Remaining CCW components are reviewed as listed below.

*Unit 3*

A few components assigned the CCW system code support the RHR system pressure boundary and are therefore evaluated with the residual heat removal systems (Section 2.3.2.1). Components providing cooling to the SI systems are evaluated with the safety injection systems (Section 2.3.2.4). Remaining CCW components are reviewed as listed below.

Table 2.3.3-3-IP2 and Table 2.3.3-3-IP3 list the component types that require aging management review.

Table 3.3.2-3-IP2 and Table 3.3.2-3-IP3 provide the results of the aging management review.

License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

*Unit 2*

LRA-208168
LRA-209762
LRA-227781
LRA-235122
LRA-251783
LRA-9321-2720
LRA-9321-2730

*Unit 3*

LRA-9321-27203
LRA-9321-27223
LRA-9321-27273
LRA-9321-27293-002
LRA-9321-27303
LRA-9321-27453
LRA-9321-27513-001
LRA-9321-27513-002

### 2.3.3.4 Compressed Air

System Description

The compressed air systems includes the instrument air (IA) and station air (SA) subsystems.

*Unit 2*

*Instrument Air*

The purpose of the IA system is to provide a continuous supply of dry, oil-free air for pneumatic instruments and controls. Instrument air is provided by duplicate compressors with duplicate dryers and filters. In addition, alternate supplies are provided from the Unit 2 station air system and Unit 1 station air system. A connection has been provided in the station air system to allow a backup supply of air from portable compressed air equipment. The instrument air system, although designed to meet air capacity requirements, utilizes the higher capacity Unit 1 station air compressors as a primary source of air supply. Because of the high capacity output capability of the Unit 1 air compressors, Unit 2 is able to utilize the Unit 1 air compressors for all Unit 1 and 2 station and instrument air requirements. Unit 2 station air compressor and both Unit 2 instrument air compressors serve as backups. The system includes the compressors, dryers, filters, receivers, distribution piping and valves, instruments and controls.

Those items essential for safe operation and safe cooldown are provided with air reserves or gas bottles. These supplies enable the equipment to function in a safe manner until the air supply is reestablished. The IA system includes piping, air bottles, valves and controls supporting this air reserve function, but does not include all of the air or gas bottles, which are part of other systems. The system may also be used to provide air to the post-accident venting system to pressurize containment in support of hydrogen control, but this is not a safety-related function.

The IA system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.
- Provide a backup source of safety-related air / nitrogen supply to all pneumatic devices and valve actuators that require air pressure to go to their proper safeguards position during and after an accident.

The IA system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The IA system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide a backup source of compressed gas for pneumatically operated components for the Appendix R event (10 CFR 50.48).
- Support safe shutdown in the event of a fire in the auxiliary feed pump room (10 CFR 50.48) (see Section 2.3.4.5).

*Station Air*

The purpose of the SA system is to provide compressed air throughout the plant. Station air is distributed to hose connections throughout the plant, primarily for maintenance activities. The station air system can also serve as an alternate supply to the instrument air system. Station air is supplied by a Unit 2 air compressor but can also be supplied by Unit 1 compressors and equipment. The SA system consists of Unit 1 and Unit 2 station air equipment including air compressors, air receivers, filters, dryers, distribution piping and valves.

The SA system has the following intended function for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.

The SA system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The SA system has the following intended function for 10 CFR 54.4(a)(3).

- Support safe shutdown in the event of a fire in the auxiliary feed pump room (10 CFR 50.48) (see Section 2.3.4.5).

*Unit 3*

*Instrument Air*

The purpose of the IA system is to provide a continuous supply of dry, oil-free air for pneumatic instruments and controls. Instrument air is provided by duplicate compressors with duplicate dryers and filters. Each compressor discharges into a common air receiver. In addition, a backup supply is taken from the station air system. To meet current and future instrument air loads, a third compressor/dryer package is available to supply the conventional plant. This compressor can also supply the station air system with backup air, if necessary. The system includes the compressors, dryers, filters, receivers, distribution piping and valves, instruments and controls.

Those items essential for safe operation and safe cooldown are provided with air reserves or gas bottles. These supplies will enable the equipment to function in a safe manner until the air supply is re-established. The IA system includes piping, valves and controls supporting this air reserve function, but does not include the air or gas bottles, which are part of other systems.

The IA system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.
- Provide a backup source of safety-related air / nitrogen supply to all pneumatic devices and valve actuators that require air pressure to go to their proper safeguards position during and after an accident.

The IA system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The IA system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide a backup source of compressed gas for the atmospheric steam dump valves for Appendix R event reliability (10 CFR 50.48).
- Provide a backup source of compressed gas for the steam driven auxiliary feedwater flow control valves and speed controller under Appendix R (10 CFR 50.48) and station blackout (10 CFR 50.63) conditions.

### *Station Air*

The purpose of the SA system is to provide compressed air for pneumatic tools, circulating water pump priming, and miscellaneous cleaning and maintenance purposes throughout the secondary and primary plants. The system includes diesel-driven and motor-driven air compressors, inter- and after-coolers, receiver, piping, valves, and instruments and controls. Distribution piping to the containment includes containment isolation valves.

The SA system has the following intended function for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.

The SA system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The SA system has no intended functions for 10 CFR 54.4(a)(3).

UFSAR References

Unit 2: Sections 9.6.4 (IA) and 9.6.4.2 (SA)

Unit 3: Section 9.6.3 (IA and SA)

Components Subject to Aging Management Review

*Unit 2*

IA system components that support safe shutdown in the event of a fire in the auxiliary feed pump room are evaluated in Section 2.3.4.5. Components containing nitrogen are evaluated with the nitrogen systems (Section 2.3.3.5). Nonsafety-related compressed air system components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining compressed air system components are reviewed as listed below.

*Unit 3*

Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining compressed air system components are reviewed as listed below.

Table 2.3.3-4-IP2 and Table 2.3.3-4-IP3 list the component types that require aging management review.

Table 3.3.2-4-IP2 and Table 3.3.2-4-IP3 provide the results of the aging management review.

## License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

*Unit 2*

- LRA-9321-2035
- LRA-9321-2036
- LRA-9321-2736-0
- LRA-9321-4022-0
- LRA-242656-0
- LRA-242688-0
- LRA-251232-0
- LRA-308762
- LRA-D-227176

*Unit 3*

- LRA-9321-20353-0
- LRA-9321-20363-0, Sheet 2
- LRA-9321-21543-0
- LRA-9321-40223-0
- LRA-9321-70093-0
- LRA-9321-70123-0
- LRA-D-360858

### 2.3.3.5 Nitrogen Systems

System Description

*Unit 2*

The purpose of the gas (GAS) system is to store and distribute gases, primarily hydrogen, carbon dioxide, and nitrogen, for various uses around the plant. The GAS system includes the hydrogen ($H_2$) gas subsystem, carbon dioxide ($CO_2$) gas subsystem, and nitrogen ($N_2$) gas subsystem.

Hydrogen gas is supplied to the chemical and volume control tank for oxygen scavenging of the RCS water to support water chemistry control. Hydrogen is also supplied to the main generator for cooling gas. Carbon dioxide gas is provided for purging the main generator of hydrogen to support outage work on the generator.

The nitrogen gas subsystem includes the various nitrogen supplies to provide motive gas to individual components as a backup to the instrument air supply and to various components for process functions (including cover gas, purge gas, and gas required for operation of level instrumentation). Nitrogen enters containment through several containment penetrations.

For the Appendix R safe shutdown, nitrogen is required for pneumatically actuated components. The nitrogen gas subsystem provides a nitrogen supply to the atmospheric dump valves (ADVs), a backup nitrogen supply to auxiliary feedwater system valve actuators, a portable nitrogen bottle that can be carried into containment to operate the auxiliary spray valve, the ability to provide motive gas for the charging pumps suction valve, and the nitrogen supply to pneumatically powered instrumentation.

Nitrogen supplies that are required to support the SBO event include the nitrogen supply to the atmospheric dump valves (ADVs), backup nitrogen supply to auxiliary feedwater (AFW) system valve actuators, and the nitrogen supply to pneumatically powered instrumentation.

The GAS system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for the lines penetrating containment.
- Provide a means to actuate the pressurizer PORVs via the nitrogen accumulators.
- Provide nitrogen to the IVSW system for sealing pressure between containment isolation valves.
- Provide backup motive gas for AFW valves.

The GAS system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The GAS system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide motive gas to pneumatically actuated valves as required during an Appendix R (10 CFR 50.48) or SBO (10 CFR 50.63) event.
- Provide nitrogen to pneumatically powered instrumentation (pressurizer level, pressurizer pressure, and steam generator level) that is used during the during an Appendix R (10 CFR 50.48) or SBO (10 CFR 50.63) event.

*Unit 3*

The purpose of the nitrogen (N2) system is to provide motive gas to individual components as a backup to the instrument air supply and nitrogen supply to various components for process functions (including cover gas, calibration gas, purge gas, and gas required for operation of level instrumentation). Nitrogen enters containment through several containment penetrations that must isolate to provide containment isolation capability under accident conditions. The containment penetration pressurization system (see Section 2.3.2.3, Containment Isolation Support Systems, WCCPP system) also has nitrogen-filled components that are not included with this system code.

The N2 system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for the lines penetrating containment.
- Provide a means to actuate the pressurizer PORVs via the nitrogen accumulators and backup supply from the safety injection accumulators.
- Provide capability to operate various components via backup N2 accumulators following a loss of instrument air.
- Prevent oversupply of nitrogen to the condensate storage tank. This function is performed by the orifice in the nitrogen supply to the condensate storage tank.

The N2 system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The N2 system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide motive gas to ADVs for cooldown during an Appendix R event (10 CFR 50.48).
- Provide backup motive gas for AFW valves during an Appendix R event (10 CFR 50.48).

UFSAR References

*Unit 2*

To the extent they are described in the UFSAR, the components in this system code that provide motive gas are addressed in the UFSAR section describing the system they support: Section 4.3.4.2 for nitrogen to the power operated relief valves; Section 7.2.1.5 for nitrogen to pneumatically powered instrumentation; Section 10.2.6.3 for nitrogen to the auxiliary feedwater system; Section 9.2 for hydrogen to CVCS; and Section 10.2.2 for hydrogen to the main generator.

*Unit 3*

The components in this system code that provide motive gas are described in the UFSAR with the system they support. Section 7.3 of the UFSAR identifies the backup supply to the power operated relief valves from both small accumulators on the nitrogen system and an alternate backup from the nitrogen in the safety injection accumulator tanks. Section 9.6.2.5 identifies the nitrogen components required for safe shutdown, including the nitrogen supply to the atmospheric dump valves and the auxiliary feedwater system. Section 9.9.2 identifies the nitrogen system backup to the control room ventilation system dampers. Section 10.2.6 identifies the nitrogen supply to the condensate storage system.

Components Subject to Aging Management Review

*Unit 2*

GAS system components that are part of containment penetrations are evaluated with the containment penetrations (Section 2.3.2.5). A small number of components are evaluated with the compressed air systems (Section 2.3.3.4), the city water system (Section 2.3.3.17), the plant drains (Section 2.3.3.18) and with the auxiliary feedwater systems (Section 2.3.4.3). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

### *Unit 3*

A small number of N2 system components are evaluated with the auxiliary feedwater systems (Section 2.3.4.3). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

Table 2.3.3-5-IP2 and Table 2.3.3-5-IP3 list the component types that require aging management review.

Table 3.3.2-5-IP2 and Table 3.3.2-5-IP3 provide the results of the aging management review.

### License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

*Unit 2*

LRA-235296
LRA-235306
LRA-242656
LRA-242688
LRA-251232
LRA-308762
LRA-9321-2723
LRA-9321-2746

*Unit 3*

LRA-9321-21543
LRA-9321-27233
LRA-9321-27353

### 2.3.3.6 Chemical and Volume Control

System Description

*Unit 2*

The purpose of the chemical and volume control system (CVCS) is to provide inventory and chemistry control of the reactor coolant system. The CVCS provides RCS inventory management by controlling the amount of makeup and letdown to the RCS. It provides a means to control the RCS boron concentration and other RCS chemical additions. The system provides for reactor coolant cleanup including degasification and purification. This system provides seal water injection to the reactor coolant pumps and provides RCS depressurization capability via pressurizer auxiliary spray flow path. The system provides a means for injection of control poison in the form of boric acid solution from the boric acid storage tanks.

During normal plant operation, reactor coolant letdown flows through the shell side of the regenerative heat exchanger where its temperature is reduced by transferring heat to the charging fluid. The coolant then flows through a letdown orifice, which regulates flow and reduces the coolant pressure. The cooled, low-pressure water leaves the reactor containment and enters the primary auxiliary building. After passing through the non-regenerative heat exchanger and one of the mixed-bed demineralizers, the fluid flows through the reactor coolant filter and enters the volume control tank.

The coolant flows from the volume control tank to the charging pump(s), which raise the pressure above that in the reactor coolant system. Three positive displacement, variable speed charging pumps are provided. The high-pressure water flows from the primary auxiliary building to the reactor containment along two parallel paths. One path returns directly to the reactor coolant system through the tube side of the regenerative heat exchanger to the RCS cold leg. The second path injects water into the seals of the reactor coolant pumps (RCP) through seal injection filters. The RCP seal water returns to the CVCS through a seal water filter and heat exchanger back to the volume control tank.

The refueling water storage tanks and the boric acid storage tanks can provide borated water to the charging system. The refueling water storage tank is available to the charging pumps for injection of borated water. The boric acid system includes boric acid transfer pumps, a boric acid filter, and storage tanks to maintain a large inventory of concentrated boric acid solution.

The CVCS system has the following intended functions for 10 CFR 54.4(a)(1).

- Maintain the RCS pressure boundary (function performed by Class 1 RCS components that are part of this system code in the database).
- Provide containment isolation capability for lines penetrating containment.
- Provide pressure boundary for the piping connection to the RWST.

- Maintain pressure boundary interface with the CCW system at the CVCS heat exchangers cooled by CCW.

The CVCS system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The CVCS system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide capability for the charging system to support safe shutdown following an Appendix R event (10 CFR 50.48).
- Provide capability for the plant to cope with loss of all A/C power (station blackout) (10 CFR 50.63).
- Provide a flow path from the boric acid storage tanks via the boric acid transfer pumps and charging pumps as an alternate means of reactivity control for an ATWS event (10 CFR 50.62).

*Unit 3*

The purpose of the chemical and volume control system is to provide inventory and chemistry control of the reactor coolant system. The CVCS provides RCS inventory management by controlling the amount of makeup and letdown to the RCS. It provides a means to control the RCS boron concentration and other RCS chemical additions. The system provides for reactor coolant cleanup including degasification and purification. This system provides seal water injection to the reactor coolant pumps and provides RCS depressurization capability via pressurizer auxiliary spray flow path. The system provides a means for injection of control poison in the form of boric acid solution from the boric acid storage tanks.

During normal plant operation, reactor coolant letdown flows through the shell side of the regenerative heat exchanger where its temperature is reduced by transferring heat to the charging fluid. The coolant then flows through a letdown orifice, which regulates flow and reduces the coolant pressure. The cooled, low-pressure water leaves the reactor containment and enters the primary auxiliary building. After passing through the non-regenerative heat exchanger and one of the mixed-bed demineralizers, the fluid flows through the reactor coolant filter and enters the volume control tank.

The coolant flows from the volume control tank to the charging pumps, which raise the pressure above that in the reactor coolant system. Three positive displacement, variable speed charging pumps are provided. The high-pressure water flows from the primary auxiliary building to the reactor containment along two parallel paths. One path returns directly to the reactor coolant system through the tube side of the regenerative heat exchanger to the RCS cold leg. The second path injects water into the seals of the reactor coolant pumps (RCP) through seal injection filters. The RCP seal water returns to the CVCS through a seal water filter and heat exchanger back to the volume control tank.

The refueling water storage tanks and the boric acid storage tanks can provide borated water to the charging system. The refueling water storage tank is available to the charging pumps for injection of borated water. The boric acid system includes boric acid transfer pumps, a boric acid filter, and storage tanks to maintain a large inventory of concentrated boric acid solution.

The CVCS system has the following intended functions for 10 CFR 54.4(a)(1).

- Maintain the RCS pressure boundary (function performed by Class 1 RCS components that are part of this system code in the database).
- Provide containment isolation capability for lines penetrating containment.

The CVCS system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The CVCS system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide RCS reactivity, inventory and pressure (via the auxiliary pressurizer spray) control during an Appendix R event (10 CFR 50.48).
- Provide water to RCP seals during an Appendix R event (10 CFR 50.48).
- Provide a flow path from the boric acid storage tanks, via the boric acid transfer pumps and charging pumps, to inject borated water into the RCS as an alternate means of reactivity control for the ATWS event (10 CFR 50.62).

UFSAR References

Unit 2: Section 9.2.2

Unit 3: Section 9.2.2

Components Subject to Aging Management Review

*Unit 2*

CVCS components that maintain the RCS pressure boundary are evaluated with the reactor coolant system pressure boundary (Section 2.3.1.3). Some system components are evaluated with the primary makeup water systems (Section 2.3.3.7). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

*Unit 3*

CVCS components that maintain the RCS pressure boundary are evaluated with the reactor coolant system pressure boundary (Section 2.3.1.3). A small number of system components are evaluated with the primary makeup water systems (Section 2.3.3.7) and with the component cooling water systems (Section 2.3.3.3). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

Table 2.3.3-6-IP2 and Table 2.3.3-6-IP3 list the component types that require aging management review.

Table 3.3.2-6-IP2 and Table 3.3.2-6-IP3 provide the results of the aging management review.

License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

| *Unit 2* | *Unit 3* |
|---|---|
| LRA-9321-2736-0 | LRA-9321-27363-0 |
| LRA-208168-0 | LRA-9321-27513-001-0 |
| LRA-227781-0 | |

### 2.3.3.7 Primary Water Makeup

System Description

*Unit 2*

The purpose of the primary water (PW) system is to provide water for makeup to the primary plant systems as required to support normal plant operation. The PW system includes tanks, piping, valves, pumps, etc. to provide makeup water to various primary systems. The system includes a containment penetration.

The PW system is capable of providing a backup supply of cooling water to safety-related components in the event of a passive failure of the CCW system.

The PW system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide a backup source of cooling water to the CCW system for cooling of the safety injection pumps and residual heat removal pumps.
- Provide containment isolation capability for lines penetrating containment.

The PW system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The PW system has no intended functions for 10 CFR 54.4(a)(3).

*Unit 3*

The purpose of the PW system is to provide water for makeup to primary plant systems as required to support normal plant operation. The PW system includes tanks, piping, valves, pumps, etc. to provide makeup water to various primary systems. The system also provides a source of fire water to the containment. The system includes a containment penetration and one component is safety-related because it is part of the RWST pressure boundary.

The PW system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.
- Support RWST pressure boundary.

The PW system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The PW system has the following intended function for 10 CFR 54.4(a)(3).

- The system provides a source of fire water to the containment (10 CFR 50.48).

*Demineralized Water*

The demineralized water system is evaluated with the primary water system.

The purpose of the DW system is to provide demineralized water to support normal plant operation and refueling activities. The system provides demineralized water for the spent fuel pit, refueling cavity, and refueling water storage tank; for decontamination, hydrostatic testing and flushing during refueling outages; and to condensate polisher regeneration through the sluice water pumps. The system also provides a supply of water for fire protection in containment. The system includes safety-related position indications for the containment penetration isolation valves, but the valves themselves are in the PW system; consequently, this system has no safety-related mechanical function.

The DW system no intended function for 10 CFR 54.4(a)(1).

The DW system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The DW system has the following intended function for 10 CFR 54.4(a)(3).

- Provide a supply of water for fire protection in containment (10 CFR 50.48).

UFSAR References

Unit 2: Sections 9.2.2.5.13 and 9.2.2.5.14

Unit 3: PW, Section 9.2.2; DW, Sections 9.6.2.3 and 9.11.1

Components Subject to Aging Management Review

*Unit 2*

Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

*Unit 3*

Portions of the PW system that support the RWST pressure boundary are evaluated with the safety injection system (Section 2.3.2.4). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

Table 2.3.3-7-IP2 and Table 2.3.3-7-IP3 list the component types that require aging management review.

Table 3.3.2-7-IP2 and Table 3.3.2-7-IP3 provide the results of the aging management review.

License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

*Unit 2*
LRA-9321-2719
LRA-9321-2724
LRA-9321-2736
LRA-9321-2737
LRA-9321-2738
LRA-227781
LRA-235309

*Unit 3*
LRA-9321-27193-002
LRA-9321-27243
LRA-9321-27363
LRA-9321-27473
LRA-9321-27513-001
LRA-9321-27513-002

### 2.3.3.8 Heading, Ventilation and Air Conditioning

System Description

*Unit 2*

The purpose of heating, ventilation and air conditioning (HVAC) systems is to maintain the area environment for personnel and equipment. The HVAC system code includes various ventilation subsystems serving different areas of the plant. With the exception of the containment cooling and filtration system and a few components associated with the operation of other mechanical systems, the HVAC system encompasses all the ventilation systems and components for Unit 2 and some components from Unit 1. The main HVAC systems supporting plant operation include the following systems. For containment cooling and filtration, see Section 2.3.3.9. For control room HVAC, see Section 2.3.3.10.

*Containment Purge Supply and Exhaust*

The containment purge supply and exhaust system provides fresh air to purge the containment to allow for personnel access. The system consists of a makeup air unit to supply fresh air to containment, a filtration unit to filter the air released from containment, supply and exhaust ductwork, and the associated containment penetration piping and valves.

The system is not required to be in operation during design basis accidents or for any of the regulated events. The system includes two penetrations that have safety-related piping and valves that support the containment isolation function. Portions of the system are also required for their pressure boundary function to prevent drawing air into the shared fan housing for the containment purge/primary auxiliary building exhaust fans.

*Containment Pressure Relief*

The containment pressure relief system accommodates normal pressure changes in the containment during reactor power operation. The system consists of a filtration unit, fan, pressure relief ductwork, and the associated containment penetration piping and valves.

The system is not required to be in operation during design basis accidents or for any of the regulated events. The system includes a penetration that has safety-related piping and valves that support the containment isolation function.

*Containment Iodine Removal*

The containment iodine removal system consists of two auxiliary particulate and charcoal filter units installed in the containment primarily for pre-access cleanup. During power operation, the containment air particulate and gas monitor indications will help determine desirability of using either one or both of these units. These units, wholly contained within containment, are not safety-related or required during design basis accidents and are not required for regulated events.

### *Control Rod Drive Mechanism Cooling*

The control rod drive mechanism cooling system maintains the control rod drive operating coil stacks below their maximum allowable temperature during normal operation. Four fans take a suction from the control rod drive shroud and discharge into the containment atmosphere. This equipment is not required to function during accident conditions nor is it required for the response to the regulated events.

### *Primary Auxiliary Building Ventilation*

The primary auxiliary building ventilation system provides ventilation of the waste hold-up tank pit and the enclosed spaces in the primary auxiliary building (PAB). The waste hold-up tank pit houses the waste hold-up tanks, which are the central collection point for liquid radioactive waste. The primary auxiliary building houses equipment and components required for normal plant operation as well as accident mitigation functions. The primary auxiliary building heating and ventilation system maintains an acceptable operating environment for personnel and equipment during normal operating and post-accident conditions. The system includes supply and exhaust fans with associated ductwork and dampers. Filtration is not credited in any dose consequence analyses.

The primary auxiliary building ventilation system is used during normal operating conditions such as plant start-up, power operation and normal shutdown. Its operation is also required during design basis accidents and is required to support safe shutdown following a fire.

### *Fuel Storage Building Ventilation*

The fuel storage building heating and ventilation system provides heating and ventilation to the fuel storage building, minimizes leakage of unfiltered air from the building during fuel handling operations, and provides filtration of building exhaust. The system includes two fresh air tempering units with supply fans and heaters, exhaust roughing, HEPA and carbon filters, exhaust fan, motor operated dampers, and ducts. The system was originally credited in the fuel handling accident. However, the new analysis described in UFSAR Section 14.2.1.1 using the alternate source term no longer assumes operation of the ventilation system or any holdup of the radionuclides released from the spent fuel pit. Consequently, the system has no safety functions.

*Cable Spreading Room/Electrical Tunnel Ventilation*

The cable spreading room/electrical tunnel exhaust system provides ventilation of the 33' elevation of the control building. The system consists of two exhaust fans mounted above the tunnel in a plenum. Air is drawn into the cable spreading room via intake louvers on the north and south walls. The system maintains acceptable operating environment for personnel and equipment during normal operating and post-accident conditions. This equipment is required to provide cooling during design basis accidents as well as during regulated events.

*480 Volt Switchgear Room Ventilation*

The electrical switchgear room ventilation system provides ventilation of the electrical switchgear room on elevation 15' of the control building. The room is ventilated by three fans mounted in the north wall of the control building. The fans take suction from the switchgear room and discharge outside. Air is drawn into the switchgear room via a fixed louver with fire damper. The system maintains an acceptable operating environment for personnel and equipment during normal operating and post-accident conditions. This equipment is required to provide cooling during design basis accidents as well as during regulated events.

*Battery Room Exhaust*

Battery rooms in the control building and superheater building are provided with exhaust fans to prevent the long term buildup of hydrogen during normal operation when the batteries are charging. These exhaust fans are not required to function during the design basis accidents or during regulated events.

*Emergency Diesel Generator Building Ventilation*

The emergency diesel generator (EDG) building ventilation system includes exhaust fans, exhaust dampers, and intake louvers. These HVAC components are required for support of diesel operation during design basis accidents as well as regulated events such as the Appendix R safe shutdown.

*Auxiliary Feed Pump Room Ventilation*

The auxiliary boiler feed pump building heating and ventilation system is used during normal operating conditions. It consists of several exhaust fans to provide cooling during normal plant operation. A roll-up door can be opened to provide cooling for emergency operation of the AFW system. Following a fire, portable blowers can be used to ventilate this area. Therefore, operation of the auxiliary boiler feed pump building heating and ventilation system is not required during design basis accidents or for the response to regulated events.

*Diesel Fire Pump House Ventilation*

The diesel fire pump house ventilation system cools the structure housing the diesel fire pump. This structure is cooled by louvers; the diesel itself is cooled by fire water. These HVAC components are required to support fire system operation, which is credited in evaluations for 10 CFR 50 Appendix R.

*Electric Fire Pump Room Ventilation*

The electric fire pumps are located in two rooms in the Unit 1 turbine building. These rooms are cooled by exhaust fans and dampers that operate to provide cooling to the electric fire pumps. These HVAC components are required to support fire system operation, which is credited in evaluations for 10 CFR 50 Appendix R.

*Plant Vent*

The purpose of the plant vent system is to provide a flowpath for plant ventilation systems to exhaust to atmosphere. The system includes the plant vent duct and some vent flow monitoring instrumentation. The plant vent is not credited as the release point in the offsite dose analyses but, because of its proximity to the control room air intake, is the release point for control room dose calculations.

*Shield Wall Area Enclosure Heating and Ventilation System*

The IP2 shield wall area enclosure heating and ventilation system is designed to provide heating and ventilation of the shield wall area enclosure. Located in the main enclosure are components and piping associated primarily with the main steam system and feedwater system. The shield wall area enclosure heating and ventilation system is used during normal operating conditions such as plant start-up, power operation and normal shutdown. The operation of this equipment is not required during design basis accidents or for the regulated events.

*SBO/Appendix R Diesel Generator Ventilation*

Before entering the period of extended operation, IP2 will have completed the installation of a new station blackout (SBO) and Appendix R diesel. The IP2 SBO/Appendix R diesel generator is credited with providing backup power to the plant to assist in safe shutdown following a fire and following station blackout and its associated ventilation equipment is required for this equipment to function. The IP2 SBO/Appendix R diesel will utilize louvers, fire dampers, an exhaust fan, and outlet ductwork. The fan will operate when the diesel is in operation.

*Portable HVAC Credited in Appendix R*

The Appendix R safe shutdown report indicates that for a fire in certain plant areas, portable blowers and flexible ductwork can be used to ventilate the safe shutdown equipment and are therefore required to support 10 CFR 50 Appendix R. Power can be supplied by portable generators.

*Security Diesel Room Ventilation*

The IP2 security diesel generator is credited with providing emergency lighting for some areas to support a safe shutdown following a fire. The ventilation equipment that provides cooling to this diesel consists of dampers, ductwork, and an engine driven blower that provides ventilation for the room when the engine is in operation. This ventilation is required for the operation of the security diesel, which is credited with providing power for lighting for 10 CFR 50 Appendix R.

*Turbine Hall Ventilation*

The turbine building ventilation system draws air in through fixed and adjustable louvers and awning sashes. The air is exhausted by power roof ventilators and wall exhaust fans. This cooling is not required during design basis accidents and not required for plant response to regulated events.

*Technical Support Center Ventilation*

The technical support center ventilation maintains appropriate environmental conditions in the technical support center. The system includes fans, dampers, filters and cooling equipment. This system performs no safety-related functions during accident conditions and is not required for support of any regulated events.

*Administration Building Ventilation*

The administration building ventilation system provides heating, ventilation and air conditioning to the administration building personnel and equipment. This system is not required during design basis accidents or regulated events.

The HVAC system has the following intended functions for 10 CFR 54.4(a)(1).

- Maintain the integrity of the plant vent and PAB ventilation as a release path to minimize post-accident control room dose.
- Provide containment isolation capability for lines penetrating containment.
- Provide ventilation for components that are required for design basis events.

The HVAC system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The HVAC system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide ventilation during a station blackout (10 CFR 50.63).
- Provide ventilation to support Appendix R safe shutdown (10 CFR 50.48).

*Unit 3*

The Unit 3 HVAC systems evaluation includes the following HVAC systems. For containment cooling and filtration, see Section 2.3.3.9. For control room HVAC, see Section 2.3.3.10.

*Control Building Heating and Ventilation*

The purpose of the control building heating and ventilation (CBHV) system is to provide heating and ventilation for the 15' and 33' elevations of the control building. It also provides ventilation to battery rooms 31, 32 and 34 to maintain hydrogen concentrations below maximum acceptable limits during normal plant operation. The system includes dampers, ductwork, heaters, and fans.

The CBHV system has the following intended function for 10 CFR 54.4(a)(1).

- Provide ventilation to the cable spreading room and 480 VAC switchgear rooms at elevations 15' and 33' of the Control Building.

The CBHV system has no intended functions for 10 CFR 54.4(a)(2).

The CBHV system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide ventilation to the cable spreading room and 480 VAC switchgear rooms during an Appendix R event (10 CFR 50.48).
- Provide ventilation system isolation (via fire damper operability) as required during an Appendix R event (10 CFR 50.48).

*Fire Barriers*

The purpose of the fire barriers (FBAR system) is to provide structural barriers and components for penetrations in the structural barriers that can prevent or delay the spread of fire from one area to the adjoining area. This system code includes fire doors and fire dampers. The system includes fire dampers that also support the operation of HVAC systems such as the diesel generator building HVAC system.

The fire doors and fire dampers are evaluated with their respective structures for their fire barrier function. Fire damper housings that form part of the pressure boundary of an HVAC system within the scope of license renewal are included in the associated HVAC evaluation to ensure the housing function of supporting the HVAC system operation is maintained.

The FBAR system has the following intended function for 10 CFR 54.4(a)(1).

- Support the operation of safety-related HVAC systems.

The FBAR system has no intended functions for 10 CFR 54.4(a)(2).

The FBAR system has the following intended function for 10 CFR 54.4(a)(3).

- Support the operation of HVAC systems required for fire protection (10 CFR 50.48).

### *Fuel Storage Building Heating and Ventilation*

The purpose of the fuel storage building heating and ventilation (FSBHV) system is to provide heating and ventilation to the fuel storage building, minimize leakage of unfiltered air from the building during fuel handling operations, and to provide filtration of building exhaust. The system includes two fresh air tempering units with supply fans and heaters, exhaust roughing, HEPA and carbon filters, exhaust fan, motor operated dampers and ducts.

During normal operation, the fresh air tempering units and exhaust fan operate, as necessary, to ventilate and heat the fuel storage building, with exhaust air passing through the roughing and HEPA filters. During fuel handling operations, the system maintains a slight negative pressure in the building and the system is configured to pass all ventilation exhaust through the roughing filters, HEPA filters, and charcoal filters prior to release through the plant vent.

The system was originally credited in the fuel handling accident. However, the new analysis described in UFSAR Section 14.2.1 using the alternate source term no longer assumes operation of the ventilation system or any holdup of the radionuclides released from the spent fuel pit. Consequently, the system has no safety functions.

The FSBHV system has no intended functions for 10 CFR 54.4(a)(1).

The FSBHV system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The FSBHV system has no intended functions for 10 CFR 54.4(a)(3).

*Heating, Ventilation, and Air Conditioning*

The purpose of HVAC systems is to maintain the area environment for personnel and equipment. HVAC systems for specific buildings or areas of buildings generally have a separate system code. The HVAC system code includes portions of various ventilation systems serving different areas of the plant. The HVAC system code includes fans and dampers for various areas such as the electrical tunnels, intake structure, and fire pump house. Portable ventilation equipment supporting safe shutdown requirements is also included in this system code.

The HVAC system has the following intended function for 10 CFR 54.4(a)(1).

- Provide ventilation to areas with safety-related equipment including the electrical tunnels, cable spreading room and intake structure.

The HVAC system has no intended functions for 10 CFR 54.4(a)(2).

The HVAC system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide ventilation to areas with fire protection equipment (10 CFR 50.48).
- Provide ventilation to areas with equipment required for Appendix R safe shutdown (10 CFR 50.48).

*Primary Auxiliary Building Heating and Ventilation*

The purpose of the PABHV system is to provide heating and ventilation of the waste hold-up tank pit and the enclosed spaces in the primary auxiliary building. The waste hold-up tank pit houses the waste hold-up tanks which are the central collection point for liquid radioactive waste. The primary auxiliary building houses equipment and components required for normal plant operation as well as accident mitigation functions. The equipment and components located in the primary auxiliary building include pumps for the component cooling water system, safety injection system, residual heat removal system, containment spray system as well as others. Also located in the primary auxiliary building are tanks associated with the waste disposal system that collect radioactive liquids and gases. The primary auxiliary building heating and ventilation system maintains acceptable operating environment for personnel and equipment during normal operating and post-accident conditions.

The primary auxiliary building (PAB) and tank pit are ventilated by balanced flow between supply and exhaust maintaining a slight negative pressure in the PAB. Air supplied to each building initially enters areas of low contamination. Air is exhausted out of the plant vent from areas of higher contamination by a second set of fans, after passing through filters. Filtration is not credited in any dose consequence analyses.

The PABHV system has the following intended function for 10 CFR 54.4(a)(1).

- Provide ventilation during postulated abnormal and accident conditions to support operation of safety-related pumps and motors.
- Sweep post-LOCA recirculation gases from the PAB to the plant vent.

The PABHV system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The PABHV system has the following intended function for 10 CFR 54.4(a)(3).

- Provide ventilation to Appendix R safe shutdown equipment in the PAB during postulated fires (10 CFR 50.48).

*Plant Vent*

The purpose of the PV system is to provide a flowpath for plant ventilation systems to exhaust to atmosphere. The system includes the plant vent duct and some vent flow monitoring instrumentation. The plant vent is not credited in the offsite dose analyses; however, it is the release point for control room dose calculations and structural integrity of the plant vent must be maintained for this purpose.

The PV system has the following intended function for 10 CFR 54.4(a)(1).

- Maintain the integrity of the plant vent as a release path to minimize post accident control room dose.

The PV system has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

*Security Heating and Ventilation*

The purpose of the SECHV system is to provide heating and ventilation to the security building, including ventilation supporting operation of the security propane generator. The system includes fans, heaters and dampers.

The SECHV system has no intended functions for 10 CFR 54.4(a)(1) or (a)(2).

The SECHV system has the following intended function for 10 CFR 54.4(a)(3).

- Support the security propane generator which provides lighting in the yard to illuminate operator access/egress routes used for an Appendix R event (10 CFR 50.48).

*Vapor Containment Purge and Supply*

The purpose of the VCHVP system is to purge the containment air to the plant vent for dispersion to the environment and provide makeup air to containment. The exhaust air is filtered and monitored before discharging to the plant vent. Radioactivity concentrations inside containment are maintained within acceptable limits by operation of the purge system during reactor shutdown. The purge system is maintained isolated to maintain containment integrity whenever the plant is above the cold shutdown condition. The system includes filters, heating coils, fans, penetration isolation valves, ductwork, instruments and controls. Some system components share a common pressure boundary with PABHV system components.

The VCHVP system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.
- Support PABHV system pressure boundary.

The VCHVP system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The VCHVP system has no intended functions for 10 CFR 54.4(a)(3).

*Vapor Containment Pressure Relief*

The purpose of the VCPR system is to relieve the normal pressure changes in containment during reactor power operation. This system consists of a pressure relief line equipped with three isolation valves, one inside and two outside the containment. The pressure relief line discharges through roughing, HEPA, and charcoal filters to the plant vent.

The VCPR system has the following intended function for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.

The VCPR system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The VCPR system has no intended functions for 10 CFR 54.4(a)(3).

The evaluation of HVAC systems also includes the Unit 3 Appendix R diesel generator heating and ventilation system (see Section 2.3.3.16) and the Unit 3 emergency diesel generator heating and ventilation (see Section 2.3.3.14), described below. These heating and ventilation components are part of their respective diesel generator systems and support the intended functions of that system. Remaining Unit 3 HVAC systems have no intended functions and are therefore not within the scope of license renewal.

*Appendix R Diesel Generator Heating and Ventilation*

The IP3 Appendix R DG is in its own enclosure in the yard. Ventilation to the engine is provided by exhaust fans that draw outside air through covered intake dampers/louvers when ventilation is required. Ventilation to the electrical enclosure and battery enclosure are provided by exhaust fans that draw outside air in through louvers. This equipment is required to support operation of the IP3 Appendix R DG, which is credited for 10 CFR 50 Appendix R requirements and also for station blackout response.

*Emergency Diesel Generator Building Heating and Ventilation*

The IP3 EDG building houses and protects the emergency diesel generators. The rooms have outside air fixed louvers, pneumatically operated adjustable louvers and exhaust fans with motor operated discharge dampers. The pneumatically operated dampers operate from control air supplied by the EDG starting air system. Operation of EDG building ventilation is relied upon to support EDG operations during design basis accidents and during regulated events.

UFSAR References

*Unit 2*

| | |
|---|---|
| Containment systems | Section 5.3.2 |
| PAB HVAC | Section 9.8 |
| Fuel storage building ventilation | Section 9.10 |

*Unit 3*

| | |
|---|---|
| Fire barriers (FBAR) | Section 9.6.2.2 |
| FSBHV | Sections 1.3.6, 9.5 and 14.2.1 |
| PABHV | Section 9.8 |
| VCHVP | Section 5.3.2.3 |
| VCPR | Section 5.3.2.5 |

Remaining Unit 2 and Unit 3 systems are not described in the UFSARs.

### Components Subject to Aging Management Review

#### *Unit 2*

Some HVAC components are evaluated with the compressed air systems (Section 2.3.3.4) or with containment cooling and filtration systems (Section 2.3.3.9). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components, including portable ventilation equipment used following a fire, are reviewed as listed below.

#### *Unit 3*

Instrument air volume tanks, tubing and valves in the vapor containment pressure relief system needed for the containment penetration valves to close are evaluated with the compressed air systems (Section 2.3.3.4). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components, including damper housings that have a HVAC pressure boundary function, are reviewed as listed below.

Table 2.3.3-8-IP2 and Table 2.3.3-8-IP3 list the component types that require aging management review.

Table 3.3.2-8-IP2 and Table 3.3.2-8-IP3 provide the results of the aging management review.

### License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

| *Unit 2* | *Unit 3* |
|---|---|
| LRA-9321-4022-0 | LRA-9321-40223-0 |
| | LRA-9321-41023-001-0 |
| | LRA-9321-41683-0 |

### 2.3.3.9 Containment Cooling and Filtration

System Description

*Unit 2*

The purpose of the containment cooling and filtration (CCF) system is to provide containment cooling. Air recirculation cooling during normal operation is accomplished using air handling units discharged into a common header ductwork distribution system to ensure adequate flow of cooled air throughout the containment. Each air-handling unit consists of the following equipment arranged so that, during normal and accident operation, air flows through the unit in the following sequence: cooling coils, moisture separators (demisters), centrifugal fan with direct-drive motor, and distribution header. The heat is rejected to cooling coils supplied by the service water system. These units provide cooling for normal operation, emergency operation, and during safe shutdown following a fire.

The CCF system has the following intended function for 10 CFR 54.4(a)(1).

- Remove heat from the reactor containment building following the initial phase of a loss-of-coolant accident or steam line break inside the containment.

The CCF system has no intended functions for 10 CFR 54.4(a)(2).

The CCF system has the following intended function for 10 CFR 54.4(a)(3).

- Support safe shutdown for Appendix R (10 CFR 50.48) and station blackout (10 CFR 50.63) by maintaining ambient temperature inside containment such that operator entry can be made in order to perform manual valve manipulations.

*Unit 3*

The purpose of the vapor containment building ventilation (VCV) system is to provide recirculation cooling and filtration in containment to remove the normal heat losses from equipment and piping in containment during plant operation, assure personnel access and safety during shutdown, and depressurize the containment vessel following an accident. Air recirculation cooling and filtering during normal operation is accomplished using all five air handling units discharged to a common header ductwork distribution system. Each air handling unit consists of cooling coils, centrifugal fan with direct-drive motor, and distribution header. In the event of an accident, the flow path will first be diverted through a compartment containing moisture separators, HEPA filters and charcoal filters. Dose analyses for some accidents credit fission product removal by the HEPA filters, but the charcoal filters are not credited in any analyses.

The VCV system has the following intended function for 10 CFR 54.4(a)(1).

- Provide post-accident containment atmosphere cooling, depressurization and fission product removal.

The VCV system has no intended functions for 10 CFR 54.4(a)(2).

The VCV system has the following intended function for 10 CFR 54.4(a)(3).

- Provide containment atmosphere cooling for Appendix R safe shutdown (10 CFR 50.48).

UFSAR References

Unit 2: Sections 5.3.2.2 and 6.4.2

Unit 3: Sections 5.3.2.2 and 6.4.2

Components Subject to Aging Management Review

*Unit 2 and Unit 3*

System components are reviewed as listed below.

Table 2.3.3-9-IP2 and Table 2.3.3-9-IP3 list the component types that require aging management review.

Table 3.3.2-9-IP2 and Table 3.3.2-9-IP3 provide the results of the aging management review.

License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

| *Unit 2* | *Unit 3* |
|---|---|
| LRA-9321-F-4022-0 | LRA-9321-F-40223-0 |
| LRA-209762-0 | LRA-9321-F-27223-0 |

### 2.3.3.10 Control Room Heating, Ventilation and Cooling

System Description

*Unit 2*

The purpose of the control room ventilation system is to maintain the central control room (CCR) in a safe, habitable environment during normal operation and under accident conditions. The system includes an air conditioning unit with fan, steam heating coil, and roughing filter to recirculate air inside the control room, and a backup fan in parallel with the air conditioning unit. The system also includes a filter unit consisting of HEPA filters, charcoal filters, post-filters, and booster fans to permit filtration of incoming air, which provides a slight positive pressure in the control room during accident conditions. System ducts, dampers and controls allow three system operating modes: Mode 1 (Normal Operation), with outside air makeup; Mode 2 (Safety Injection or High Radiation), outside filtered air; and Mode 3 (Toxic Gas or Smoke), all outside air isolated. Operation of this system, including the filtration of incoming air, is credited in control room dose analyses.

Unit 1 and Unit 2 share a central control room. The Unit 1 control room ventilation equipment for the central control room has been modified for recirculation mode only. The Unit 1 control room ventilation equipment is not credited for cooling or filtration.

The CCR HVAC system has the following intended function for 10 CFR 54.4(a)(1).

- Maintain a suitable environment in the main control room for operating personnel and safety-related equipment.
- Provide filtration of incoming air and maintain a positive pressure in the control room.

The CCR HVAC system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The CCR HVAC system has the following intended function for 10 CFR 54.4(a)(3).

- Provide system isolation (via damper operability) as required during an Appendix R event (10 CFR 50.48).

*Unit 3*

The purpose of the CRHV system is to maintain the CCR in a safe, habitable environment during normal operation and under accident conditions. The fresh air intake duct supplying make-up air to the control room is provided with air-operated dampers to divert this air through carbon filters or close off this supply to the control room completely. The control room air conditioning, heating and ventilation system consists of two air conditioning units with fans and roughing filters; roughing, HEPA and charcoal filters; charcoal filter booster fans; and heaters, exhaust fans, and duct system with dampers, controls and instrumentation. The system also includes five independent air conditioning units that supplement the cooling capacity of the water-cooled air conditioning units. Each supplemental unit has an evaporator and electric heater wall-mounted in the control room.

The CRHV system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide ventilation as required to maintain the desired temperature and relative humidity inside the CCR during accident conditions.
- Provide filtering of airborne radioactive particulates entering the CCR (via the 10% incident mode) to ensure that the radiological exposures to the CCR operators are within acceptable limits during accident conditions involving radioactive release.
- Maintain a slight positive pressure in the CCR (via the 10% incident mode) during accident conditions involving radioactive release to prevent infiltration.
- Maintain habitability of the CCR with no makeup (100% recirculation) air during an accidental release of toxic gases.

The CRHV system has no intended function for 10 CFR 54.4(a)(2).

The CRHV system has the following intended functions for 10 CFR 54.4(a)(3).

- Maintain the CCR temperature during an Appendix R event (10 CFR 50.48) (function may also be performed by the CCR supplemental cooling units).
- Provide ventilation system isolation (via damper operability) as required during an Appendix R event (10 CFR 50.48).

UFSAR References

Unit 2: Section 9.9

Unit 3: Section 9.9

Components Subject to Aging Management Review

*Unit 2*

Control room HVAC components are reviewed as listed below.

*Unit 3*

Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

Table 2.3.3-10-IP2 and Table 2.3.3-10-IP3 list the component types that require aging management review.

Table 3.3.2-10-IP2 and Table 3.3.2-10-IP3 provide the results of the aging management review.

License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

| *Unit 2* | *Unit 3* |
|---|---|
| LRA-252665 | LRA-9321-41023-002 |
| LRA-138248 | LRA-9321-27223 |

### 2.3.3.11 Fire Protection – Water

System Description

*Unit 2*

The purpose of the fire protection (FP) system is to provide fire protection for the station through the use of water, dry chemicals, foam, detection and alarm systems, and rated fire barriers, doors, and dampers. Passive mechanical components in the FP system include many fire-fighting subsystem components and features, such as piping, fire dampers, valves, hydrants, portable fire extinguishers, a 300,000 gallon fire water tank, etc. Also included in this system code are the Unit 1 fire pumps and some associated Unit 1 fire protection components such as hydrants, valves, fire extinguishers, and strainers. Plant drain components in the FP system are passive fire protection features required to assure adequate protection of safety-related equipment from water damage in areas containing fixed suppression systems.

The fire protection system is evaluated as fire protection – water in this section and fire protection – $CO_2$, halon, and RCP oil collection systems in Section 2.3.3.12.

The fire protection – water system draws water from two storage tanks: a 1.5 million-gallon storage tank supplied by the city water distribution system for fire protection purposes, and a 300,000-gallon fire water storage tank (FWST) supplied with city water, which is provided as a redundant water supply for the water-based fire protection systems. The pumping facilities consist of two electric fire pumps taking suction from the site city water main. There are also two small electric pressure maintenance pumps provided to maintain pressure on the fire water system. A diesel fire pump is provided for redundant pumping capabilities and normally takes suction from the FWST. The pumping facilities provide flow and pressure requirements for the water-based fire protection systems. The fire protection water distribution system consists of outdoor underground piping, indoor distribution piping, isolation valves, strainers, hose stations, and outdoor hydrants. The water-based fire suppression systems include the wet pipe sprinkler systems, pre-action sprinkler systems, deluge water spray systems, foam water spray systems, and hydrants and hose stations.

The FP – water system has no intended functions for 10 CFR 54.4(a)(1).

The FP – water system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.
- Provide a backup source of makeup water to the spent fuel pit.

The FP – water system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide fixed automatic and manual fire suppression (including hydrants, hose stations and portable extinguishers) to extinguish fires in vital areas of the plant (10 CFR 50.48).
- Assure adequate protection of safety-related equipment from water damage in areas susceptible to flooding (10 CFR 50.48).
- Assure that drain systems in areas containing combustible materials prevent the spreading of fires into other areas of the plant (10 CFR 50.48).

*Unit 3*

The purpose of all fire protection systems is to provide fire protection for the station through the use of water, foam, halon, detection and alarm systems, and rated fire barriers, doors, and dampers. The fire water system components are identified in system code FRW. This includes fire water and foam subsystem pumps, piping, hydrants, hose reels, valves, tanks, drains, etc. The fuel oil supply to the fire pump house diesel is also included in this system code. Fire protection systems include the fire detection and alarm system, described below. For $CO_2$ and halon systems, see Section 2.3.3.12, Unit 3 systems. For the fire barrier system code, see Section 2.3.3.8, Heating, Ventilation and Air Conditioning, Unit 3 systems.

*Fire Water*

The fire water (FRW) system includes two ground level storage tanks supplied by the city water distribution system. Heating provisions for the storage tanks consists of two sets of dual electric heaters and two sets of dual circulating pumps. The pumping facilities maintain system pressure and provide makeup for system leakage by jockey pumps. There are two main fire pumps provided for automatically supplying water in the event of a fire. One pump is electric motor driven and the other is diesel engine driven. The pumping facilities provide flow and pressure requirements for the water-based fire protection systems. The fire protection water distribution system consists of outdoor underground and above-ground piping and indoor distribution piping in all buildings except the containment building. Demineralized water piping is used for fire protection inside containment. Unit 3 underground piping has two inter-connections with the Unit 1 fire protection system. These inter-connections represent defense-in-depth for the Unit 3 fire protection systems with respect to both water supply and pumping capacity. The distribution system also consists of isolation valves, strainers, hose stations, and outdoor hydrants. The distribution piping delivers anticipated fire water requirements to individual suppression systems. The yard hydrants provide an effective hose stream protection for exterior hazards and for supplementary use for fire conditions within the main buildings of the plant. The water-based fire suppression systems include the wet pipe sprinkler systems, pre-action sprinkler systems, deluge water spray systems, foam water spray systems, and hydrants and hose stations.

Areas with safety-related equipment or equipment required for safe plant shutdown that are provided with automatically operated fire protection have either gravity or pump drains designed to handle the maximum quantity of spray water to prevent local flooding. The FRW system includes plant drain components that protect safety-related equipment from the effects of failure of class III components.

The fire water system can be used to provide makeup to the spent fuel pit. This is not a safety function but is included as a license renewal intended function.

The fire protection – water system has no intended functions for 10 CFR 54.4(a)(1).

The fire protection – water system has the following intended function for 10 CFR 54.4(a)(2).

- Support makeup from the fire water system to the spent fuel pit.
- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The fire protection – water system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide fixed automatic and manual fire suppression (including hydrants, hose stations and portable extinguishers) to extinguish fires in vital areas of the plant (10 CFR 50.48).
- Assure adequate protection of safety-related equipment from water damage in areas susceptible to flooding (10 CFR 50.48).

*Fire Detection and Alarm*

The purpose of the fire detection and alarm (FDA) system is to transmit fire alarm and supervisory signals to the control room where audible and visual alarms are provided. The system includes signals for actuation of fire detectors, status of most installed fire suppression systems, control and indicating lights for the fire pumps, level indicators for the fire water storage tanks, and door status indicating lights for operator notification of critical fire doors. The FDA system is primarily an electrical system; however, it does include instrument air valves and piping that are part of a fire alarm in the electrical tunnel. The alarm actuates on a loss of pressure within the piping.

The FDA has no intended functions for 10 CFR 54.4(a)(1) or (a)(2).

The FDA has the following intended function for 10 CFR 54.4(a)(3).

- Support a fire alarm in the electrical tunnel (10 CFR 50.48).

UFSAR References

Unit 2: Section 9.6.2

Unit 3: Section 9.6.2.3; FDA, Section 9.6.2.4

Components Subject to Aging Management Review

*Unit 2*

The drain portion of the system is evaluated with plant drains (Section 2.3.3.18). The fuel oil subsystem components are evaluated with fuel oil systems (Section 2.3.3.13). A small number of components are evaluated with city water systems (Section 2.3.3.17). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

*Unit 3*

The mechanical portions of the FDA system are in scope for license renewal, but the pressure boundary for the instrument air piping is not required for the system to perform its intended function. Therefore, the components are not subject to aging management review.

The drain portion of the system is evaluated with plant drains (Section 2.3.3.18). The fuel oil subsystem components are evaluated with fuel oil systems (Section 2.3.3.13). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

Table 2.3.3-11-IP2 and Table 2.3.3-11-IP3 list the component types that require aging management review.

Table 3.3.2-11-IP2 and Table 3.3.2-11-IP3 provide the results of the aging management review.

License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

*Unit 2*

LRA-9321-4006
LRA-227551
LRA-227552
LRA-227553

*Unit 2 (cont.)*

LRA-227554
LRA-193183
LRA-192506

*Unit 3*

LRA-9321-40903
LRA-9321-40913

### 2.3.3.12 Fire Protection – $CO_2$, Halon, and RCP Oil Collection Systems

System Description

*Unit 2*

The purpose of the fire protection (FP) system is to provide fire protection for the station through the use of water, dry chemicals, foam, detection and alarm systems, and rated fire barriers, doors, and dampers. Passive mechanical components in the FP system include many fire-fighting subsystem components and features, such as piping, fire dampers, valves, hydrants, portable fire extinguishers, a 300,000 gallon fire water tank, etc. Also included in this system code are the Unit 1 fire pumps and some associated Unit 1 fire protection components such as hydrants, valves, fire extinguishers and strainers.

The fire protection system is evaluated as fire protection – $CO_2$, halon, and RCP oil collection systems in this section and fire protection – water in Section 2.3.3.11.

The fire protection – $CO_2$, halon, and RCP oil collection system consists of fixed fire suppression systems utilizing carbon dioxide ($CO_2$) and bromotrifluoromethane (Halon 1301) as well as oil leakage collection for the reactor coolant pumps (RCPs). The $CO_2$ and halon systems consist of gas storage tanks and the necessary piping, valves, and instrumentation. The RCP oil collection system consists of drain pans, collection tanks and the necessary piping, valves, and instrumentation to collect any leakage of the RCP lube oil system.

The Unit 2 fire protection – $CO_2$ system is not required to meet the requirements of 10 CFR 50.48 and is therefore not within the scope of license renewal.

A fixed halon fire suppression system is used to meet 10 CFR 50.48 requirements for the cable spreading room. The halon system for the cable spreading room is a total flooding, manually actuated system that is divided into four zones of discharge nozzles.

The reactor coolant pump oil collection system is capable of collecting lube oil from all potential pressurized and unpressurized leakage sites in the reactor coolant pump lube oil systems. Leakage is collected and drained to a vented closed tank that can hold the required lube oil system inventory.

The FP – halon and RCP oil collection systems have no intended functions for 10 CFR 54.4(a)(1).

The RCP oil collection system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The FP – halon and RCP oil collection systems have the following intended functions for 10 CFR 54.4(a)(3).

- Provide fixed automatic and manual fire suppression to extinguish fires in vital areas of the plant (10 CFR 50.48).
- Provide each reactor coolant pump with an oil collection system that is designed to contain and direct the oil to remote storage containers in the event of an oil leak.

*Unit 3*

The purpose of the fire protection systems is to provide fire protection for the station through the use of water, foam, halon, detection and alarm systems, and rated fire barriers, doors, and dampers. Fire water system components are in system code FRW, which is evaluated in Section 2.3.3.11. For the fire barrier (FBAR) system code, see Section 2.3.3.8, Heating, Ventilation and Air Conditioning, Unit 3 systems.

The FP – $CO_2$, halon and RCP oil collection systems for IP3 are in the following system codes:

- the $CO_2$ system is in system code $CO_2$;
- Halon is in system code HAL; and
- the RCP oil collection components are in system code RCS.

*$CO_2$*

The purpose of the $CO_2$ system is to provide fire protection and to provide $CO_2$ gas to purge the main generator. The $CO_2$ fire protection system is provided with two ten-ton capacity low pressure tanks, a distribution header and associated piping and valves. An automatic total flooding carbon dioxide fire suppression system is provided to protect the 480V switchgear room, cable spreading room, diesel generator rooms and the turbine generator exciter enclosure.

A local application $CO_2$ fire suppression system is provided to protect hazards in the turbine building, including the main boiler feedwater pumps, turbine governor, main steam and re-heat valves, and generator bearings.

Before maintenance work is performed on the main generator, the hydrogen gas must be evacuated from the system. Inert carbon dioxide gas from a carbon dioxide gas vaporizing system is used to purge the generator. The Unit 2 $CO_2$ gas vaporizing system may also be used through a supply line from the Unit 1 intake structure area.

*Halon*

The purpose of the HAL system is to suppress fires in the administration/service building in the technical support center computer room. Halon is also used in the Appendix R diesel enclosure and in the meteorological building. Halon is not used to protect any safety-related plant equipment. Protection of the Appendix R diesel from fire is not itself an Appendix R required function.

For Unit 3, the halon system has no intended functions for 10 CFR 54.4(a)(1), (a)(2) or (a)(3).

*RCP Oil Collection*

The RCP oil collection system is designed, engineered, and installed such that an RCP lube oil system failure will not lead to fire during normal or design basis accident conditions and will not fail in a manner to impact the capability of any safety-related system during the safe shutdown earthquake. The collection system is capable of collecting lube oil from all potential pressurized and unpressurized leakage sites in the reactor coolant pump lube oil systems. Leakage is collected and drained to a vented closed tank that can hold the required lube oil system inventory. A flame arrester in each tank vent prevents fire flashback.

The collection system consists of leak proof enclosures or pans under oil-bearing components to contain oil from leaks.

The FP – $CO_2$ and RCP oil collection systems have no intended functions for 10 CFR 54.4(a)(1).

The RCP oil collection system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The FP – $CO_2$ and RCP oil collection systems have the following intended functions for 10 CFR 54.4(a)(3).

- Provide automatic and manual $CO_2$ flooding for areas of the plant that (1) contain safety-related equipment and/or (2) pose significant hazards to areas containing safety-related equipment (10 CFR 50.48).

- Provide each reactor coolant pump with an oil collection system that is designed to contain and direct the oil to remote storage containers in the event of an oil leak.

### UFSAR References

Unit 2: Section 9.6.2

Unit 3: $CO_2$, Sections 9.6.2.3 and 10.2.2; Halon, Section 9.6.2

### Components Subject to Aging Management Review

Fire protection – $CO_2$, halon, and RCP oil collection systems components are reviewed as listed below.

Table 2.3.3-12-IP2 and Table 2.3.3-12-IP3 list the component types that require aging management review.

Table 3.3.2-12-IP2 and Table 3.3.2-12-IP3 provide the results of the aging management review.

### License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

| *Unit 2* | *Unit 3* |
|---|---|
| LRA-D-8775-002-0 | LRA-9321-24403-0 |
| LRA-D-8775-004-0 | LRA-9321-51081-0 |
| LRA-D-8775-005-0 | |
| LRA-1952M015-0 | |
| LRA-9321-23523-0 | |

### 2.3.3.13 Fuel Oil

<u>System Description</u>

This evaluation covers fuel oil systems for Unit 2 and 3 emergency diesel generators, Unit 2 security diesel generator, Unit 2 and 3 Appendix R diesel generators, and Unit 2 and 3 fire protection diesel-driven fire pumps. The fuel oil supply components for these systems are components in their respective systems but are evaluated together as fuel oil components. The grouping of similar components from various plant systems into one consolidated review is appropriate, as stated in NUREG-1800, *Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants*, Section 2.1.3.1.

*<u>Unit 2</u>*

*Fuel Oil*

The Unit 2 fuel oil (FO) system code includes the 1,000,000-gallon Unit 1 fuel oil tank and many of the associated Unit 1 components. This system code does not include the safety-related fuel oil components associated with the emergency diesel generators and does not contain any safety-related components. The FO system includes components that supply the bulk fuel oil to site components, including the house heating boiler and the bulk fuel oil supply to Unit 3. This tank and associated piping are not required to support fire diesel or EDG operation, since these components have separate fuel oil tanks.

The FO system has no intended functions for 10 CFR 54.4(a)(1) or (a)(3).

The FO system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

*Gas Turbine System*

The gas turbine system description is included in the fuel oil section because its only intended function for license renewal is performed by its fuel oil subsystem.

The purpose of the gas turbine (GT) system is to provide an alternate source of standby power for the site. Gas turbine Unit 1 is located adjacent to the Unit 1 turbine building. Gas turbine Units 2 and 3 are located at the Buchanan substation. The gas turbines have been credited as an alternate power supply for the Appendix R and station blackout events; however, these functions will be assumed by the IP2 SBO/Appendix R diesel generator (SBO/ARDG) prior to the period of extended operation.

The fuel supply for gas turbines in the Unit 2 GT system supplies dedicated fuel capacity to supplement fuel oil storage for the Unit 2 and Unit 3 EDGs. This shared fuel storage consists of two onsite 30,000-gallon fuel oil tanks and a 200,000-gallon storage tank located at the Buchanan substation site. A minimum of 29,000 gallons from these storage tanks is dedicated for use by the emergency diesel generators. The tanks are not directly connected to the EDG fuel oil storage tanks, but trucking facilities exist to ensure oil can be transferred within one day's notice.

The GT system has no intended functions for 10 CFR 54.4(a)(1) or (a)(3).

The GT system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain an oil supply for use by the Unit 2 and Unit 3 emergency diesel generators.

*Unit 3*

Unit 3 has no system code for fuel oil. Each system that uses fuel oil includes these components in its respective system.

*Fuel Oil Subsystems, Both Units*

The fuel oil subsystems included in this evaluation are as follows. Except where noted, these descriptions apply to both units.

*Emergency Diesel Generators*

Diesel fuel oil storage and transfer systems supply fuel to the emergency diesel generators with each having their own fuel oil day tank plus an underground storage tank. The day tanks are located within the diesel-generator buildings. The fuel is fed from the day tank by an engine-driven fuel oil pump to supply the engine. The day tank is automatically filled during engine operation from its dedicated underground storage tank located adjacent to the diesel-generator building. Each underground storage tank is provided with a motor-driven transfer pump to transfer fuel to the day tank.

*Fire Protection Diesel Engines*

Independent diesel fuel oil storage and transfer systems supply fuel to the fire protection diesel engines for Unit 2 and Unit 3. The Unit 2 fuel oil storage tank, pump, and associated components are located in the Unit 2 diesel fire pump house. The Unit 3 fuel oil storage tank and components are located in the Unit 3 fire protection pump house.

*IP2 Security Diesel Generator*

An independent diesel fuel oil storage and transfer system supplies fuel to the Unit 2 security diesel generator, which has its own fuel oil day tank located within the security access building diesel generator room plus an independent underground storage tank adjacent to the building.

*Appendix R Diesel Generators*

An independent diesel fuel oil storage and transfer system supplies fuel to the Unit 2 SBO/ Appendix R diesel generator (see Section 2.3.3.16) using the gas turbine fuel oil storage tanks and transfer pumps located in the oil room. The SBO/Appendix R diesel generator has its own day tank, which supplies fuel to the engine. The day tank is automatically filled during engine operation from the storage tanks by the transfer pumps.

An independent diesel fuel oil storage and transfer system supplies fuel to the Unit 3 Appendix R diesel generator, which has its own fuel oil day tank plus an underground storage tank. The day tank supplies fuel directly to the engine. The fuel oil day tank is automatically filled during engine operation from its storage tank by a transfer pump.

Fuel oil subsystems have the following intended function for 10 CFR 54.4(a)(1).

- Support operation of systems which perform a safety function.

Fuel oil subsystems have the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

Fuel oil subsystems have the following intended function for 10 CFR 54.4(a)(3).

- Support operation of systems credited for meeting the requirements of station blackout (10 CFR 50.63) and for fire protection (10 CFR 50.48).

UFSAR References

Unit 2: EDGs, Section 8.2.3; GT, Sections 8.1 and 8.2

Unit 3: EDGs, Sections 8.2, 16.1.3; shared fuel oil storage tanks for EDGs (tanks in the IP2 GT system), Section 1.3.1

Components Subject to Aging Management Review

Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

Table 2.3.3-13-IP2 and Table 2.3.3-13-IP3 list the component types that require aging management review.

Table 3.3.2-13-IP2 and Table 3.3.2-13-IP3 provide the results of the aging management review.

License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

*Unit 2*

LRA-9321-2030
LRA-227551
LRA-400881
LRA-260586
LRA-304122
LRA-302773

*Unit 3*

LRA-9321-20303
LRA-9321-40903
LRA-9321-21213

### 2.3.3.14 Emergency Diesel Generators

System Description

*Unit 2*

The purpose of the emergency diesel generator (EDG) system is to supply emergency shutdown power in the event of loss of all other AC auxiliary power. The emergency diesel generator system consists of three emergency diesel generator sets, each consisting of a diesel engine coupled to a 480 volt generator. Each emergency diesel is automatically started by two redundant air motors, each unit having an air storage tank and compressor system. Each diesel includes its own starting air subsystem, fuel oil subsystem, intake air subsystem, exhaust subsystem, lube oil subsystem, and jacket water cooling subsystem. The system also includes ventilation equipment for the diesel generator building.

The EDG system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide reliable source of backup emergency power for the ESF loads that are required during a design basis accident concurrent with a loss of offsite power.

The EDG system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The EDG system has the following intended function for 10 CFR 54.4(a)(3).

- Provide sufficient emergency backup power during an Appendix R event (10 CFR 50.48).

*Unit 3*

The purpose of the emergency diesel generator system is to supply emergency shutdown power in the event of loss of all other AC auxiliary power. The emergency diesel generator system consists of three emergency diesel generator sets, each consisting of a diesel engine coupled to a 480-volt generator. Each emergency diesel is automatically started by two redundant air motors, each unit having an air storage tank and compressor system. Each diesel includes its own starting air subsystem, fuel oil subsystem, intake air subsystem, exhaust subsystem, lube oil subsystem, and jacket water cooling subsystem. The system also includes ventilation equipment for the diesel generator building.

The emergency diesel generator system includes the system codes EDG and EG. The EDG system code includes various components of the diesel generator supporting systems but does not include the diesel generators themselves. The EG system code includes various components of the diesel generator supporting systems and includes the diesels generators.

The EDG system has the following intended function for 10 CFR 54.4(a)(1).

- Supply emergency shutdown power in the event of loss of all other AC auxiliary power, with adequate capacity to supply the engineered safety features for the hypothetical accident concurrent with loss of outside power.

The EDG system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The EDG system has the following intended function for 10 CFR 54.4(a)(3).

- Provide generating capacity to service loads important-to-safety during an Appendix R event (10 CFR 50.48).

### *Emergency Generator*

The emergency diesel generator system includes the system codes EDG and EG. The EG system code includes various components of the diesel generator supporting systems and includes the diesels generators.

The EG system has the following intended function for 10 CFR 54.4(a)(1).

- Supply emergency shutdown power in the event of loss of all other AC auxiliary power, with adequate capacity to supply the engineered safety features for the hypothetical accident concurrent with loss of outside power.

The EG system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The EG system has the following intended function for 10 CFR 54.4(a)(3).

- Provide generating capacity to service loads important-to-safety during an Appendix R event (10 CFR 50.48).

## UFSAR References

Unit 2: Section 8.2.3

Unit 3: Sections 8.2 and 16.1.3

## Components Subject to Aging Management Review

### *Unit 2*

Some of the valves in this system code are part of the service water system pressure boundary and are evaluated with the service water system (Section 2.3.3.2). The fuel oil subsystem components are evaluated with fuel oil (Section 2.3.3.13). A small number of components are evaluated with the city water system (Section 2.3.3.17). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

### *Unit 3*

The HVAC components that are part of this system code are evaluated with HVAC systems (Section 2.3.3.8). The fuel oil subsystem components are evaluated with fuel oil (Section 2.3.3.13). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

Table 2.3.3-14-IP2 and Table 2.3.3-14-IP3 list the component types that require aging management review.

Table 3.3.2-14-IP2 and Table 3.3.2-14-IP3 provide the results of the aging management review.

## License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

*Unit 2*

LRA-9321-2722
LRA-9321-2028
LRA-9321-2029
LRA-A207698

*Unit 3*

LRA-9321-27223
LRA-9321-20293
LRA-9321-21193

*Unit 3 (cont.)*

LRA-9321-20283
LRA-9321-41023-001

### 2.3.3.15 Security Generators

System Description

*Unit 2*

The purpose of the security (SEC) system is to provide plant security equipment. The majority of the equipment in this system is not mechanical. The security diesel is included in system code SEC. The security diesel provides back up electrical power to security equipment, including lighting used to illuminate the operator access/egress routes used during an Appendix R event.

The SEC system has no intended functions for 10 CFR 54.4(a)(1) or (a)(2).

The SEC system has the following intended function for 10 CFR 54.4(a)(3).

- Provide power for lighting in the yard to illuminate operator access/egress routes for an Appendix R event (10 CFR 50.48).

*Unit 3*

The purpose of the security propane generator (SPG) is to provide power to the security lighting system and other security functions. A portion of this security lighting is credited with meeting Appendix R III.J (emergency lighting) to illuminate access and egress to the Appendix R diesel generator, the main and backup service water pumps, condensate storage tank, and refueling water storage tank.

The SPG system has no intended functions for 10 CFR 54.4(a)(1) or (a)(2).

The SPG system has the following intended function for 10 CFR 54.4(a)(3).

- Provide lighting in the yard to illuminate operator access/egress routes used for an Appendix R event (10 CFR 50.48).

UFSAR References

Unit 2: None

Unit 3: Section 9.6.2.6

### Components Subject to Aging Management Review

*Unit 2*

The fuel oil subsystem components are evaluated with fuel oil (Section 2.3.3.13). Remaining components are reviewed as listed below.

*Unit 3*

Security generator components are reviewed as listed below.

Table 2.3.3-15-IP2 and Table 2.3.3-15-IP3 list the component types that require aging management review.

Table 3.3.2-15-IP2 and Table 3.3.2-15-IP3 provide the results of the aging management review.

### License Renewal Drawings

No license renewal drawings are provided for the security generators as there are no flow diagrams associated with these components.

### 2.3.3.16 Appendix R Diesel Generators

System Description

*Unit 2*

The purpose of the SBO/Appendix R diesel generator (SBO/ARDG) system is to provide power to selected equipment and power supplies relied on for Appendix R and station blackout events. The SBO/Appendix R diesel generator is capable of providing sufficient power for safe shutdown loads.

The SBO/Appendix R diesel generator (SBO/ARDG) will be the source of alternate AC power credited for IP2 compliance with 10 CFR 50.63 continuing through the period of extended operation. The SBO/ARDG will replace the gas turbines to provide power for Appendix R and station blackout events. The integrated plant assessment for license renewal identified the SBO/ARDG as within the scope of license renewal.

The SBO/Appendix R diesel will be located inside the Unit 1 turbine building. The SBO/Appendix R diesel generator installation will be a self-contained package that is designed to operate upon a complete loss of power. The package contains batteries, a battery charger, jacket water heater and cooler, jacket water pump, lube oil heater and cooler, lube oil pump, and necessary filters and strainers. The SBO/Appendix R diesel generator can supply the safe shutdown loads through the 6.9 kV distribution and the emergency 480 V buses and motor control centers or the turbine building switchgear and motor control centers.

The SBO/ARDG system has no intended functions for 10 CFR 54.4(a)(1) or (a)(2).

The SBO/ARDG system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide power to selected equipment and power supplies relied on for Appendix R (10 CFR 50.48) and station blackout (10 CFR 50.63) events.

*Unit 3*

The purpose of the ARDG system is to provide power to selected equipment and power supplies relied on for Appendix R and station blackout events. The Appendix R diesel generator is capable of providing sufficient power for safe shutdown loads. The diesel was installed in compliance with 10 CFR 50 Appendix R, but also supports compliance with SBO requirements. The Appendix R diesel is located in a separate structure in the yard area. The Appendix R diesel generator installation is a self-contained package that is designed to operate upon a complete loss of power. The package contains a starting air compressor, batteries, a battery charger, jacket water heater, lube oil heater, fuel oil pump and lube oil pumps, and necessary filters and strainers. The Appendix R diesel generator can supply the safe shutdown loads through the 6.9 kV distribution and the emergency 480 V buses and motor control centers or the turbine building switchgear and motor control centers.

The ARDG system has no intended functions for 10 CFR 54.4(a)(1) or (a)(2).

The ARDG system has the following intended function for 10 CFR 54.4(a)(3).

- Provide power to selected equipment and power supplies relied on for Appendix R (10 CFR 50.48) and station blackout (10 CFR 50.63) events.

UFSAR References

Unit 2: None

Unit 3: Sections 8.1.1 and 8.2.3

Components Subject to Aging Management Review

*Unit 2*

Fuel oil supply components are evaluated with fuel oil (Section 2.3.3.13). Ventilation for the ARDG system is evaluated with HVAC systems (Section 2.3.3.8). Remaining components are reviewed as listed below.

*Unit 3*

Fuel oil supply components are evaluated with fuel oil (Section 2.3.3.13). Ventilation for the ARDG system is evaluated with HVAC systems (Section 2.3.3.8). Remaining components are reviewed as listed below.

Table 2.3.3-16-IP2 and Table 2.3.3-16-IP3 list the component types that require aging management review.

Table 3.3.2-16-IP2 and Table 3.3.2-16-IP3 provide the results of the aging management review.

### License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

| *Unit 2* | *Unit 3* |
|---|---|
| LRA-400882 | LRA-9321-21203 |
| LRA-400885 | LRA-9321-21223 |
| | LRA-9321-21233 |

### 2.3.3.17 City Water

System Description

*Unit 2*

The purpose of the city water (CYW) system is to provide water to various components throughout the plant. The CYW system was originally installed for Unit 1, but it now has functions for all three units. The CYW system code designator includes the Unit 1 and Unit 2 components. Water is supplied to the CYW system from the Village of Buchanan. The boundary of the plant system begins with the supply piping from the water main and includes pressure regulating valves, strainers, water meters and backflow preventers. After metering, the water flows to a manifold which allows the water to either flow directly to the plant or to the 1.5 million-gallon city water storage tank for storage. City water is used for a variety of purposes throughout the plant, including supply to the fire protection systems, SBO/Appendix R diesel generator (see Section 2.3.3.16), and sanitary and potable facilities, such as emergency showers, eye wash stations, humidifiers, hose connections, sinks, water coolers, water heaters, and lavatories. Water is supplied to radiation monitors for purging and various equipment for makeup or cooling.

City water may also be used for emergency purposes such as a backup supply to the auxiliary feedwater pumps. The system is also a backup to CCW for bearing and seal water cooling for the charging pumps, safety injection pumps, and residual heat removal pumps.

The CYW system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide containment isolation for the city water piping containment penetration.

The CYW system has the following intended functions for 10 CFR 54.4(a)(2).

- Provide an emergency backup supply of water from the city water storage tank to the AFW systems of both Units 2 and 3 for cooling the RCS when condensate storage tank (CST) water supply is exhausted.
- Provide a backup source of make-up water for the spent fuel pit.
- Provide a backup source of cooling water to the CCW system for cooling the charging pumps, safety injection pumps, and residual heat removal pumps.
- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The CYW system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide a supply of water (from the city water tank) to fire protection system components including the fire pumps, fire hydrants, hose reel stations inside containment, fire water tank, and various sprinkler and deluge systems (10 CFR 50.48).

- Provide a supply of water to the chemical and volume control systems for cooling ancillary components associated with the charging pumps following a fire (10 CFR 50.48).
- Support safe shutdown in the event of a fire in the auxiliary feed pump room (10 CFR 50.48) (see Section 2.3.4.5).
- Provide water supply to the SBO/Appendix R diesel generator following Appendix R (10 CFR 50.48) and station blackout events (10 CFR 50.63).
- Provide water supply to the AFW system following a fire (10 CFR 50.48).

*Unit 3*

The purpose of the city water (CWM) system is to provide water to various components throughout the plant. The city water supply was originally installed for Unit 1 but now has functions for all three units. The city water tank and many of the shared site components are included in the Unit 2 description of system code CYW. Only the Unit 3 components are included in the CWM system code. City water is used for a variety of purposes throughout Unit 3, including a supply of water to fire protection systems, to various equipment for makeup or cooling, and to sanitary and potable facilities, such as emergency showers, eye wash stations, hose connections, sinks, water coolers, water heaters, and lavatories. The system also provides a backup but not safety-grade source of water to the AFW pumps and can provide makeup to the spent fuel pit.

The CWM system has no intended functions for 10 CFR 54.4(a)(1).

The CWM system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.
- Provide a redundant source of water to the AFW pumps.
- Provide makeup to the spent fuel pit.

The CWM system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide water supply to the fire protection tanks (10 CFR 50.48).
- Provide water supply to the AFW pumps during an Appendix R event (10 CFR 50.48).

UFSAR References

Unit 2: Sections 9.6.3 and 10.2.6.3

Unit 3: Sections 6.1.1 and 10.3.1 refer to but do not describe the system.

## Components Subject to Aging Management Review

### *Unit 2*

Components that support safe shutdown in the event of a fire in the auxiliary feed pump room are evaluated in Section 2.3.4.5. Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

### *Unit 3*

Components of the city water makeup system that provide water to the auxiliary feedwater system are evaluated with the auxiliary feedwater systems (Section 2.3.4.3). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

Table 2.3.3-17-IP2 and Table 2.3.3-17-IP3 list the component types that require aging management review.

Table 3.3.2-17-IP2 and Table 3.3.2-17-IP3 provide the results of the aging management review.

## License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

*Unit 2*

LRA-9321-4006
LRA-9321-2018
LRA-227551
LRA- 227552
LRA-193183

*Unit 2 (cont.)*

LRA-192505
LRA-192506
LRA-9321-2729
LRA-227781
LRA-400882

*Unit 3*

LRA-9321-20183
LRA-9321-20343-002
LRA-9321-20343-001

### 2.3.3.18 Plant Drains

System Description

Plant drains are passive fire protection features required to assure adequate protection of safety-related equipment from water damage in areas containing fixed suppression systems. Plant drain components also provide assurance that drain systems in areas containing combustible materials are prevented from spreading fires into other areas of the plant. Some plant drains protect safety-related equipment from the effects of flooding.

Plant drain components are included in various systems but are grouped for this evaluation. The grouping of similar components from various plant systems into one consolidated review is appropriate, as stated in NUREG-1800, *Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants*, Section 2.1.3.1.

*Unit 2*

Plant drain components are included in the fire protection system (FP) and waste disposal system (WDS).

For a description of the fire protection system, see Section 2.3.3.11.

The purpose of the waste disposal system (WDS) is to collect and process all potentially radioactive primary plant wastes for removal from the plant site. The system collects and processes both gaseous and liquid wastes.

The system processes gaseous waste from the primary and auxiliary systems. The system collects, compresses and stores the waste gases and provides for sampling and release of the gas. Gases vented to the vent header flow to the waste gas compressor suction header. One of the two compressors is in continuous operation with the second unit as backup for peak load conditions. From the compressors, gas flows to one of the four large gas decay tanks. The header arrangement at the tank inlet allows the operator to fill, reuse, or discharge gas to the environment. Six additional small gas decay tanks are supplied for use during degassing of the reactor coolant prior to a cold shutdown.

The system collects and processes liquid wastes from throughout the plant including wastes from equipment drains, radioactive chemical laboratory drains, decontamination drains, demineralizer regeneration, and floor drains. The waste holdup tank serves as the collection point for liquid wastes. Waste liquids drain to the waste holdup tank by gravity flow or drain to the sump tank or to the containment or primary auxiliary building sumps, then are pumped to the waste holdup tank. The liquid waste holdup tank is processed by sending its contents to the Unit 1 waste collection system. The WDS also collects and transfers liquid drained from the reactor coolant system directly to the chemical and volume control system for processing.

The system includes the vent header, waste gas compressors, large and small waste gas decay tanks, waste gas analyzer, pumps, collection tanks, station drainage piping, floor drains, instruments and controls, and piping and valves. The system includes several containment penetrations and accompanying isolation components. The system also includes the piping, valves, instruments and controls to monitor the condensation from the containment fan cooler units.

The WDS system has the following intended function for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.

The WDS system has the following intended functions for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.
- Assure adequate protection of safety-related equipment from water damage in areas susceptible to flooding.

The WDS system has the following intended function for 10 CFR 54.4(a)(3).

- Assure adequate protection of safety-related equipment from water damage in areas susceptible to flooding from fire water (10 CFR 50.48).

*Unit 3*

Areas provided with automatically operated fire protection have either gravity or pump drains designed to handle the maximum quantity of spray water to prevent local flooding. Plant drains protect safety-related equipment in the diesel generator rooms, electrical tunnels, primary auxiliary building, and auxiliary feed pump room from the effects of failure of Class III components.

Either floor drains are adequate to remove fire suppression water or water will flow through other passages to protect safety related equipment. In cases where safety-related equipment may be lost due to inadvertent actuation of a fire system, redundant systems are available to achieve safe shutdown.

Plant drain components are included in the floor drains system (FD), fire water system (FRW), and liquid waste disposal system (LWD). The FD system is not required for the response to the regulated events. Drainage for flooding protection is provided by other systems.

For a description of the floor drains system, see Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2), Floor Drains. For a description of the FRW system, see Section 2.3.3.11.

The purpose of the LWD system is to collect and process liquid wastes from throughout the plant, including wastes from equipment drains, radioactive chemical laboratory drains, decontamination drains, demineralizer regeneration, and floor drains. The system also collects and transfers liquid drained from the reactor coolant system directly to the chemical and volume control system for processing. The system includes piping, valves, pumps, collection tanks, instruments and controls. The system includes several containment penetrations and accompanying isolation components.

The LWD system has the following intended function for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.

The LWD system has the following intended functions for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.
- Assure adequate protection of safety-related equipment from water damage in areas susceptible to flooding.

The LWD system has the following intended function for 10 CFR 54.4(a)(3).

- Assure adequate protection of safety-related equipment from water damage in areas susceptible to flooding from fire water (10 CFR 50.48).

UFSAR References

Unit 2: Section 11.1

Unit 3: Sections 9.6.2.3, 11.1 and 16.1.3

Components Subject to Aging Management Review

*Unit 2*

A small number of WDS components are evaluated with the containment spray systems (Section 2.3.2.2), the safety injection systems (Section 2.3.2.4), the city water system (Section 2.3.3.17), the primary makeup water systems (Section 2.3.3.7), the component cooling water systems (Section 2.3.3.3), and the reactor coolant system pressure boundary (Section 2.3.1.3). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19).

WDS containment penetration components and drains that protect safety-related equipment from flooding damage due to fire water are reviewed as listed below.

*Unit 3*

A small number of LWD system components are evaluated with the safety injection systems (Section 2.3.2.4) and the primary makeup water systems (Section 2.3.3.7). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

Table 2.3.3-18-IP2 and Table 2.3.3-18-IP3 list the component types that require aging management review.

Table 3.3.2-18-IP2 and Table 3.3.2-18-IP3 provide the results of the aging management review.

License Renewal Drawings

Containment penetrations in the WDS and LWD systems are shown on LRA-9321-2719 and LRA-9321-27193 sheet 1.

Some plant drain flow paths are shown only on plant layout and equipment drawings, which are not suitable for LRA drawings. In lieu of LRA drawings, the floor drain routing, describing floor drain flow paths included in this evaluation, is provided in the table below.

**Table 2.3.3-18-A**
**Floor Drains Routing**

| Route Number | Description |
|---|---|
| 1 | IP2: Fire Area A, Zone 32A, Electrical Tunnel in the Primary and Control Building, contains automatic closed head, preaction water spray systems. Water from the actuated sprinklers in the electrical tunnel flow down the sloped floor toward the cable spreading room. At the end of the tunnel, a properly sized drain routes water to the yard where drainage terminates. |
| 2 | IP2: Fire Area G, Zone 10, Diesel Generator Building, contains an automatic (closed head) spray system with backflow prevention devices. Five drainage sumps are provided in the building and connect to the site drainage system routing water from elevation 64’ to elevation 18’ and terminates at manhole 17. |

## Table 2.3.3-18-A
## Floor Drains Routing (Continued)

| Route Number | Description |
|---|---|
| 3 | IP2: Primary Auxiliary Building (PAB) drains protect safety-related equipment from flooding at various elevations throughout the building. Drain water is routed through a series of 4" drains to a deep sump located at the 15' elevation. The door leading to the main transformer yard is designed to provide for drainage to the yard to prevent RHR pump failure in the unlikely event the pipe failure is undetected. Operator actions are also credited to prevent flooding of the RHR pumps. |
| 4 | IP3: Fire Area CTL-3, Zones 10, 101A, 102A, Diesel Generator Building, contains automatic close head water spray systems in each zone. Floor sumps are located in each EDG room connected to 24" pipes carrying fire or flood water outside the building through buried piping and the "high water level valve" manhole to the Hudson River. Additional drains carry water to the Diesel Generator Building sump upon failure of service water or diesel cooling water piping or inadvertent actuation of the fire system. Two 500 gpm sump pumps automatically remove sump water. The additional drains and sump pumps are not subject to aging management review since the 24" passive drains are adequate to remove flood water. |
| 5 | IP3: The electrical tunnels are provided with floor drains to carry water from the cable tray pre-action water spray nozzles (automatic, closed head) to grade outside the tunnel. |
| 6 | IP3: The Primary Auxiliary Building (PAB) is designed so flooding from any elevation will result in water settling at the lowest elevation (15'). Each room utilizes drains to protect safety-related equipment from flooding at various elevations throughout the building. Drain water is routed through a series of 4" drains to a deep sump located at the 15' elevation. Sufficient drainage area is provided in addition to a flap installed in the door leading to the main transformer yard in the unlikely event the pipe failure is undetected to prevent RHR pump failure. Operator actions are also credited to prevent flooding of the RHR pumps. |
| 7 | IP3: The Auxiliary Feed Pump Area is designed to protect the auxiliary feed pumps from failure due to flooding through a series of 4" drains terminating outside the building at storm drains. The door leading to the main transformer yard also has a flap for additional flood control. |
| 8 | IP3: A drain trap (component piping) in the cable spreading room is credited in the fire protection analysis to prevent loss of $CO_2$ in the event of an actuation. |

### 2.3.3.19 Miscellaneous Systems in Scope for (a)(2)

As discussed in Sections 2.1.1.2 and 2.1.2.1.2, systems within the scope of license renewal based on the criterion of 10 CFR 54.4(a)(2) interact with safety-related systems in one of two ways: functional or physical. A functional failure is one where the failure of a nonsafety-related SSC to perform its function impacts a safety function. A physical failure is one where a safety function is impacted by the loss of structural or mechanical integrity of an SSC in physical proximity to equipment that supports the safety function.

#### Functional Failure

Functional failures of nonsafety-related SSCs which could impact a safety function are identified in other sections of the LRA and are not included in this evaluation.

#### Physical Failure

This section summarizes the scoping and screening results based on 10 CFR 54.4(a)(2) because of the potential for physical interactions which could affect a safety function.

##### *Nonsafety-Related Systems or Components Directly Connected to Safety-Related Systems (Structural Support)*

Certain components and piping outside the safety class pressure boundary must be structurally sound in order to maintain the pressure boundary integrity of safety class piping. Each mechanical system safety-related to nonsafety-related interface was reviewed to identify the components located between the safety-related/nonsafety-related interface and the structural boundary or other point that includes enough of the nonsafety-related piping run to conservatively include the components providing structural support to components with a safety function. Systems with such components where the components are not included in another evaluation are included in Table 2.3.3-19-A-IP2 or Table 2.3.3-19-A-IP3.

##### *Nonsafety-Related Systems or Components with the Potential for Spatial Interaction with Other Systems or Components that Could Prevent Accomplishment of a Safety Function*

The following modes of spatial interaction are described in Section 2.1.1.2.

*Physical Impact or Flooding*

The evaluation of interactions due to physical impact or flooding resulted in the inclusion of structures and structural components. Structures and structural components are reviewed in Section 2.4.

*Pipe Whip, Jet Impingement, or Harsh Environments*

Systems containing nonsafety-related high energy lines that can affect equipment with a safety function are included in this review if not evaluated in another review. These systems are included in the system list in Table 2.3.3-19-A-IP2 or Table 2.3.3-19-A-IP3.

*Leakage or Spray*

Nonsafety-related systems and nonsafety-related portions of safety-related systems containing steam or liquid are considered within the scope of license renewal based on the criterion of 10 CFR 54.4(a)(2) if such components are located in a space containing equipment with a safety function. Systems with such components where the components are not included in another evaluation are included in the system list in Table 2.3.3-19-A-IP2 or Table 2.3.3-19-A-IP3.

The following systems, described in the referenced sections, are (1) within the scope of license renewal based on the criterion of 10 CFR 54.4(a)(2) for physical interactions and (2) the components therefore subject to aging management review are not included in another evaluation.

## Table 2.3.3-19-A-IP2
## Miscellaneous Systems within the Scope of License Renewal for 10 CFR 54.4(a)(2)

| System Number | System Name | LRA Section Describing System |
|---|---|---|
| AS | Auxiliary Steam | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |
| CCC | Conventional Closed Cooling | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |
| CF | Chemical Feed | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| COND | Condensate | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |
| CVCS | Chemical and Volume Control | Section 2.3.3.6, Chemical and Volume Control |
| CW | Circulating Water | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |
| CYW | City Water | Section 2.3.3.17, City Water |
| DOCK | Intake Structure System | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| EDG | Emergency Diesel Generator | Section 2.3.3.14, Emergency Diesel Generators |
| FO | Fuel Oil | Section 2.3.3.13, Fuel Oil |
| FP | Fire Protection | Section 2.3.3.11, Fire Protection – Water<br>Section 2.3.3.12, Fire Protection – CO2, Halon, and RCP Oil Collection Systems |
| FW | Feedwater | Section 2.3.4.2, Main Feedwater |
| FWC | Fresh Water Cooling | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |
| GAS | Gas | Section 2.3.3.5, Nitrogen Systems |
| GEN | Main Generator | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |

### Table 2.3.3-19-A-IP2
### Miscellaneous Systems within the Scope of License Renewal for 10 CFR 54.4(a)(2) (Continued)

| System Number | System Name | LRA Section Describing System |
|---|---|---|
| HSB | House Service Boiler | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| HVAC | Heating, Ventilation and Air Conditioning | Section 2.3.3.8, Heating, Ventilation and Air Conditioning |
| IA | Instrument Air | Section 2.3.3.4, Compressed Air |
| IACC | Instrument Air Closed Cooling | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |
| IGO | Ignition Oil | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| ILWH | Integrated Liquid Waste Handing | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| LO | Lube Oil | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |
| MS | Main Steam | Section 2.3.4.1, Main Steam |
| MSCL | Miscellaneous | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| NSG | Nuclear Service Grade Makeup | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| PACS | Post-Accident Containment Air Sample | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| PACV | Post-Accident Containment Vent (retired in place) | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| PSS | Primary Sampling | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| PW | Primary Water Makeup | Section 2.3.3.7, Primary Water Makeup |
| RCS | Reactor Coolant System | Section 2.3.1, Reactor Coolant System |

## Table 2.3.3-19-A-IP2
## Miscellaneous Systems within the Scope of License Renewal for 10 CFR 54.4(a)(2) (Continued)

| System Number | System Name | LRA Section Describing System |
|---|---|---|
| RMS | Radiation Monitoring | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| RW | River Water Service | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |
| SA | Station Air | Section 2.3.3.4, Compressed Air |
| SD | Boiler Blowdown | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| SFPC | Spent Fuel Pit Cooling | Section 2.3.3.1, Spent Fuel Pit Cooling |
| SGBD | Steam Generator Blowdown | Section 2.3.4.4, Steam Generator Blowdown |
| SIS | Safety Injection System | Section 2.3.2.4, Safety Injection Systems |
| SSS | Secondary Sampling | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| SW | Service Water | Section 2.3.3.2, Service Water |
| TSCD | Technical Support Center Diesel | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| TURB | Main Turbine | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| WDS | Waste Disposal System | Section 2.3.3.18, Plant Drains |
| WTP | Water Treatment Plant | Section 2.3.4.5, IP2 AFW Pump Room Fire Event |

## Table 2.3.3-19-A-IP3
## Miscellaneous Systems within the Scope of License Renewal for 10 CFR 54.4(a)(2)

| System Code | System Name | Section Describing System |
|---|---|---|
| AMA | Ammonia / Morpholine Addition | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| ASC | Auxiliary Steam and Condensate Return | Section 2.3.4.1, Main Steam |
| BLCA | Boron and Layup Chemical Addition | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| CAR | Condenser Air Removal | Section 2.3.4.1, Main Steam |
| CL | Chlorination | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| COND | Condensate | Section 2.3.4.6, Condensate |
| CP | Condensate Polisher | Section 2.3.4.6, Condensate |
| CPD | Condensate Pump Discharge | Section 2.3.4.6, Condensate |
| CPS | Condensate Pump Suction | Section 2.3.4.6, Condensate |
| CS | Containment Spray | Section 2.3.2.2, Containment Spray System |
| CVCS | Chemical and Volume Control | Section 2.3.3.6, Chemical and Volume Control |
| CW | Circulating Water | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| CWM | City Water Makeup | Section 2.3.3.17, City Water |
| CXFR | Condensate Transfer | Section 2.3.4.6, Condensate |
| DW | Demineralized Water | Section 2.3.3.7, Primary Water Makeup |
| EDG | Emergency Diesel Generator | Section 2.3.3.14, Emergency Diesel Generators |
| EG | Emergency Generators | Section 2.3.3.14, Emergency Diesel Generators |

### Table 2.3.3-19-A-IP3
### Miscellaneous Systems within the Scope of License Renewal for 10 CFR 54.4(a)(2) (Continued)

| System Code | System Name | Section Describing System |
|---|---|---|
| EX | Extraction Steam | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| FD | Floor Drains | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| FRW | Fire Water | Section 2.3.3.11, Fire Protection – Water |
| FSBHV | Fuel Storage Building HVAC | Section 2.3.3.8, Heating, Ventilation and Air Conditioning |
| FW | Feedwater | Section 2.3.4.2, Main Feedwater |
| FWP | Main Feedwater Pump and Services | Section 2.3.4.2, Main Feedwater |
| GSS | Gland Seal Steam | Section 2.3.4.1, Main Steam |
| GWD | Gaseous Waste Disposal | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| HA | Hydrazine Addition | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| HD | Heater Drain/Moisture Separator Drain/ Vent | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| HPSD | High Pressure Steam Dump | Section 2.3.4.1, Main Steam |
| IA | Instrument Air | Section 2.3.3.4, Compressed Air |
| IACC | Instrument Air Closed Cooling | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| LO | Lube Oil | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| LPSD | Low Pressure Steam Dump | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| LWD | Liquid Waste Disposal | Section 2.3.3.18, Plant Drains |

### Table 2.3.3-19-A-IP3
### Miscellaneous Systems within the Scope of License Renewal for 10 CFR 54.4(a)(2) (Continued)

| System Code | System Name | Section Describing System |
|---|---|---|
| MFW | Main Feedwater | Section 2.3.4.2, Main Feedwater |
| MS | Main Steam | Section 2.3.4.1, Main Steam |
| MTG | Main Turbine Generator | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| N2 | Nitrogen | Section 2.3.3.5, Nitrogen Systems |
| NED | Nuclear Equipment Drains | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| PABHV | Primary Auxiliary Building HVAC | Section 2.3.3.8, Heating, Ventilation and Air Conditioning |
| PRM | Process Radiation Monitoring | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| PS | Primary Plant Sampling | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| PW | Primary Water Makeup | Section 2.3.3.7, Primary Water Makeup |
| PZR | Pressurizer | Section 2.3.1, Reactor Coolant System |
| RCS | Reactor Coolant System | Section 2.3.1, Reactor Coolant System |
| RS | Reheat Steam | Section 2.3.4.1, Main Steam |
| RVLIS | Reactor Vessel Level Indication | Section 2.3.1, Reactor Coolant System |
| RW | River Water Service | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| SA | Station Air | Section 2.3.3.4, Compressed Air |
| SFPC | Spent Fuel Pit and Cooling | Section 2.3.3.1, Spent Fuel Pit Cooling |
| SGBD | Steam Generator Blowdown | Section 2.3.4.4, Steam Generator Blowdown |
| SGBDR | Steam Generator Blowdown Recovery | Section 2.3.4.4, Steam Generator Blowdown |

### Table 2.3.3-19-A-IP3
### Miscellaneous Systems within the Scope of License Renewal for 10 CFR 54.4(a)(2) (Continued)

| System Code | System Name | Section Describing System |
|---|---|---|
| SGS | Steam Generator Sampling | Section 2.3.4.4, Steam Generator Blowdown |
| SI | Safety Injection / Recirculation | Section 2.3.2.4, Safety Injection Systems |
| SO | Main Generator Seal Oil | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| SS | Secondary Plant Sampling | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| SWS | Service Water | Section 2.3.3.2, Service Water |
| TGHC | Turbine Generator Hydraulic Control | Section 2.3.4.1, Main Steam |
| THCC | Turbine Hall Closed Cooling | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| VCHA | Vapor Containment Hydrogen Analyzer | Section 2.3.3.19, Miscellaneous Systems in Scope for (a)(2) |
| VCHVP | Vapor Containment Purge and Supply | Section 2.3.3.8, Heating, Ventilation and Air Conditioning |
| VCPR | Vapor Containment Pressure Relief | Section 2.3.3.8, Heating, Ventilation and Air Conditioning |
| WCCPP | Weld Channel and Containment Penetration Pressurization | Section 2.3.2.3, Containment Isolation Support Systems |

System Description

The following systems within the scope of license renewal based on the criterion of 10 CFR 54.4(a)(2) are not described elsewhere in the application. Each system has the following intended function.

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

Components in these systems supporting this intended function are those nonsafety-related, fluid-filled components located in spaces containing equipment that supports a safety function. A "space" is defined as a room or cubicle that is separated from other "spaces" by substantial objects (such as wall, floors, and ceilings). The space is defined such that potential interaction among components is limited to the space. Nonsafety-related systems and components that contain water, oil, or steam, and are in spaces with equipment that supports a safety function are in scope and subject to aging management review under criterion 10 CFR 54.4(a)(2). For a list of these components, see "Components Subject to Aging Management Review" below.

The 2.3.3.19-XX-IPX series tables provide the aging management review results for components that support this intended function if such components are not included in other system reviews. For systems with intended functions that meet additional scoping criteria, the other intended functions are noted in the descriptions below with a reference to the section where the affected components are evaluated (e.g., containment penetration components are evaluated with Containment Penetrations, Section 2.3.2.5).

_Unit 2_

The following Unit 2 systems are within the scope of license renewal based on the criterion of 10 CFR 54.4(a)(2) and are not described elsewhere in the application.

*Chemical Feed*

The purpose of the chemical feed (CF) system is to provide chemicals to be added to secondary water systems for proper water chemistry control. Hydrazine is added to the condensate for oxygen control and ammonium hydroxide and/or volatile amines are added to maintain the pH. The system consists of tanks, pumps, piping and valves to store and transfer these chemicals.

*Intake Structure System*

The purpose of the intake structure system (system code DOCK) is to provide rough filtering of the Hudson River water fed to the circulating water and service water systems. Fish and debris are removed from the river water by the traveling screens, washed from the screens by spray from the screen wash, and returned to the river. This system code includes the Unit 1 and Unit 2 intake structures and traveling screens. These are considered structural components and are evaluated in the structural AMRs.

There are also a few mechanical components included in the DOCK system code associated with the chlorine or hypochlorite addition subsystems. These are used to add chlorine to the intake water to limit biofouling.

*Main Generator*

The purpose of the main generator (GEN) system is to produce the primary electrical output of the unit. The system includes the generator and its supporting auxiliaries, including the stator cooling water system and most components of the hydrogen seal oil system. The system has no safety-related mechanical components.

*House Service Boiler*

The purpose of the house service boiler (HSB) system is to provide steam for plant heating via the auxiliary steam system. The HSB system includes the house service boilers, supporting equipment such as fuel oil and feedwater components, and portions of the condensate collection system from the various heat loads.

*Ignition Oil*

The purpose of the ignition oil (IGO) system is to provide ignition oil to the house service boilers. This system code includes 12 valves and one pipe segment. None of the components are safety-related. Most other ignition oil components, including the tanks and pumps, are in system code HSB, House Service Boiler. See the HSB description for further information.

*Integrated Liquid Waste Handing*

The purpose of the integrated liquid waste handing (ILWH) system is to process liquid waste collected by the waste disposal system (WDS). The ILWH system was originally the main liquid radioactive waste processing system for Unit 1. It is located in the chemical system building and includes holdup and collection tanks, demineralizer and evaporative processing equipment, various pumps, valves, instruments and controls.

*Miscellaneous*

The miscellaneous (MSCL) system code includes a variety of structural, electrical and mechanical components with no collective purpose. Mechanical components within the system code include a water heater and filter/pump for the asbestos decon facility, and a small number of valves, primarily from sump and sewage flowpaths.

There are also two containment penetration ILRT stop valves in the system code. These valves, removed for ILRT purposes, are the outer containment isolation valves during normal operation.

The MSCL system also has the following intended function for 10 CFR 54.4(a)(1).

- Provide for containment isolation.

Containment penetration components in this system code are evaluated with containment penetrations (Section 2.3.2.5).

*Nuclear Service Grade Makeup*

The NSG system code includes components of the Unit 1 water treatment facility supplying water to various service systems. There are no safety-related components in this system code.

*Post-Accident Containment Air Sample*

The purpose of the post-accident containment air sample (PACS) system is to provide a post-accident air sampling, including monitoring of hydrogen concentration. A containment air sample is taken from each of the containment fan cooler units at a point located downstream from the fan. Two hydrogen/oxygen analyzers are installed. The system has a closed-loop flow path with the sampled air withdrawn from and discharged to the containment. Based on a recent license amendment (License Amendment No. 243), hydrogen monitoring is no longer required as a safety function.

The PACS system also has the following intended function for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.

Containment penetration components in this system code are evaluated with containment penetrations (Section 2.3.2.5).

*Post-Accident Containment Vent*

The purpose of the post-accident containment vent (PACV) system was originally to provide a backup to the hydrogen recombiner as a method to reduce the hydrogen concentration in containment atmosphere post-LOCA. The post-accident containment venting system consists of a common penetration line that acts as a supply line through which outside air can be admitted to the containment, and an exhaust line, with parallel valving and piping, through which hydrogen-bearing gases from containment may be vented through a filter. Based on a recent license amendment (License Amendment No. 243), hydrogen recombination is no longer required as a safety function.

The PACV system also has the following intended function for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.

Containment penetration components in this system code are evaluated with containment penetrations (Section 2.3.2.5).

*Primary Sampling*

The primary sampling system (PSS) consists of the high-radiation sampling system, which provides the representative samples for in-line monitoring and laboratory analysis under normal or post-accident conditions. Reactor coolant hot-leg liquid, pressurizer liquid, and pressurizer steam samples originating inside the reactor containment flow through separate sample lines to the sentry liquid sampling panel. The samples pass through the reactor containment to the auxiliary building where they are cooled (pressurizer steam samples are condensed and cooled) in the sample heat exchangers. The reactor coolant samples are then routed through the in-line isotopic analyzer, where specific nuclides are identified. All samples then go to the sentry high-radiation sampling system panel. This consists of a liquid sampling panel, which is subdivided into a reactor coolant module, which includes the capability for dissolved gas analysis, a demineralizer sampling module, and a radwaste sampling module. The PSS system code includes most of the components of the primary sampling system flowpath. The system code includes several containment penetration components.

The PSS system also has the following intended function for 10 CFR 54.4(a)(1).

- Maintain the RCS pressure boundary (function performed by Class 1 RCS components that are part of this system code in the database).
- Provide containment isolation capability for lines penetrating containment.

A few of the components assigned this system code support the RHR system pressure boundary and are evaluated with the residual heat removal systems (Section 2.3.2.1). Some system components are evaluated with the safety injection systems Section 2.3.2.4). Containment penetration components in this system code are evaluated with containment penetrations (Section 2.3.2.5).

*Radiation Monitoring*

The purpose of the radiation monitoring system (RMS) is to warn of any radiation health hazard and to give early warning of a plant malfunction that might lead to a health hazard or plant damage. The system includes area and process radiation monitoring equipment and includes the piping, valves, heat exchangers, etc. needed to sample process systems. Instruments are located at selected points in and around the plant to detect, compute, and record radiation levels.

The system includes radiation monitor channels comprised entirely of electrical components, and some with mechanical components used to transport a sample to and from the monitor. Two of the monitoring channels with mechanical components have safety functions.

The RMS also has the following intended functions for 10 CFR 54.4(a)(1).

- Support isolation of the containment purge and pressure relief line on high containment radiation.
- Provide containment isolation capability for lines penetrating containment.

The RMS components in the pressure boundaries of other systems are evaluated with those systems. Some system components are evaluated with the service water system (Section 2.3.3.2). Containment penetration components in this system code are evaluated with containment penetrations (Section 2.3.2.5).

*Boiler Blowdown*

The purpose of the boiler blowdown purification (SD) system is to provide a location to collect and store or process blowdown from a steam generator with a primary-to-secondary leak. In the event of primary-to-secondary coolant leakage in one or more of the steam generators, the blowdown may be manually diverted to the Unit 1 secondary boiler blowdown purification system flash tank. This system includes the flash tank, sample tank and cooler, piping, valves and instruments. Diversion of the blowdown flow to this system is not credited in any dose analyses.

*Secondary Sampling*

The purpose of the secondary sampling (SSS) system is to provide continuous sampling and analysis of the plant's secondary systems. This system is used to determine steam and condensate/feedwater quality and chemical addition requirements. The steam and water analysis station is located in the turbine building. The SSS system includes piping, valves, sample coolers, instruments and controls necessary to collect and transport samples to the sample stations.

*Technical Support Center Diesel*

The purpose of the technical support center diesel (TSCDG) system is to provide a backup power supply to the Technical Support Center. The system includes the diesel generator, fuel oil supply, and supporting instruments and controls. Certain TSCD system components are located in the superheater building, which contains safety-related equipment.

*Main Turbine*

The purpose of the main turbine (TURB) system is to receive steam from the steam generators, economically convert a portion of the thermal energy contained in the steam to electric energy from the main generator and provide extraction steam for feedwater heating.

The TURB system consists of the main turbine and instrumentation. The turbine is a tandem-compound-unit, comprising one high pressure and three low pressure cylinders. Steam is supplied to the high-pressure turbine through four control valves. The high-pressure turbine exhaust is directed to six moisture separator/reheaters where the steam is dried and reheated. Three low-pressure turbines extract the energy in the reheated high-pressure turbine exhaust steam. The low-pressure turbines exhaust directly to the condensers. The control valves, moisture separator/reheaters and condensers are not included in this system.

*Unit 3*

The following Unit 3 systems are within the scope of license renewal based on the criterion of 10 CFR 54.4(a)(2) and are not described elsewhere in the application.

*Ammonia / Morpholine Addition*

The purpose of the ammonia / morpholine addition (AMA) system is to provide ammonia or morpholine for pH control for the condensate system. The system consists of a tank, pumps, piping and valves to store and transfer these chemicals.

*Boron and Layup Chemical Addition*

The purpose of the boron and layup chemical addition (BLCA) system is to provide chemicals to the steam generators for chemistry control including periods of wet layup. The system is primarily nonsafety-related, but included in this system code are several valves that form part of the auxiliary feedwater system pressure boundary.

The BLCA system also has the following intended function for 10 CFR 54.4(a)(1).

- Support the auxiliary feedwater system pressure boundary.

Components associated with the auxiliary feedwater system pressure boundary are evaluated with the auxiliary feedwater systems (Section 2.3.4.3).

### *Chlorination*

The purpose of the chlorination (CL) system is to provide sodium hypochlorite to the intake bays to limit the microorganism fouling in these bays and in the associated water systems that use the raw water (service water, circulating water, etc.). The system includes the sodium hypochlorite tank, pumps, distribution piping and valves, instruments and controls.

### *Circulating Water*

The purpose of the circulating water system is to provide cooling water to the condenser to condense the steam exiting the low pressure turbines. Hudson River water is used as the supply of the condenser circulating water. The six condenser circulating water pumps are located in the intake structure. The circulating water is piped to the condensers and is discharged back via the discharge canal into the river. The system includes the circulating water pumps, condenser inlet and outlet water boxes, piping, valves, instruments and controls.

### *Extraction Steam*

The purpose of the extraction steam (EX) system is to provide steam from the main turbine extraction points to heat feedwater in the feedwater heaters. Steam from six extraction openings in the turbine casings is piped to the shells of the three parallel strings of feedwater heaters.

### *Floor Drains*

The purpose of the floor drains (FD) system is to remove any water collected from the floor drains. The system serves non-radioactive drains of the plant including areas of the turbine building, intake structure and diesel generator building. The FD system code includes sump pumps from the floor drains. The system includes no safety-related or augmented quality components and is not required for the response to the regulated events. Drainage for flooding protection is provided by other systems.

### *Gaseous Waste Disposal*

The purpose of the gaseous waste disposal (GWD) system is to process gaseous waste from the primary and auxiliary systems. The system collects, compresses and stores the waste gases and provides for sampling and release of the gas. The system includes the vent header, waste gas compressors, large and small waste gas decay tanks, and piping and valves. This system has no safety functions related to gaseous waste releases.

The GWD system also has the following intended function for 10 CFR 54.4(a)(1).

- Support the CCW system pressure boundary (heat exchanger components).

Components supporting the CCW system pressure boundary are evaluated with the component cooling water systems (Section 2.3.3.3).

*Hydrazine Addition*

The purpose of the hydrazine addition (HA) system is to provide hydrazine to the secondary system for oxygen control. The system includes the bulk hydrazine transfer pumps, chemical feed (mixing) tanks, and distribution piping and valves for the addition of hydrazine via the condensate system and turbine exhaust injection points. This system includes no safety-related components.

*Heater Drain/Moisture Separator Drain/Vent*

The purpose of the heater drain/moisture separator drain/vent (HD) system is to collect and transfer the drains from feedwater heaters and the moisture separator-reheaters to the suction of the main boiler feedwater pumps. The system includes the drain tank, feedwater drain pumps and associated collection piping, valves and controls.

*Instrument Air Closed Cooling*

The purpose of the instrument air closed cooling (IACC) system is to provide a heat removal medium for the instrument air compressors and aftercoolers. The system consists of a separate closed loop cooling water system of two small pumps, valves, piping, and heat exchangers that supplies cooling water to the instrument air compressors and aftercoolers and rejects heat to the service water system.

The IACC system also has the following intended function for 10 CFR 54.4(a)(1).

- Maintain the service water system pressure boundary (heat exchangers that are cooled by service water).

The IACC heat exchangers that are part of the service water pressure boundary are evaluated with the service water systems (Section 2.3.3.2).

*Lube Oil*

The purpose of the lube oil (LO) system is to maintain and provide a supply of oil for lubrication and control of the main turbine and the main boiler feedwater pumps and turbines. The system includes the main lubricating/control oil reservoirs, pumps, coolers, piping, valves and indications. The system also includes components of the main turbine controls.

*Low Pressure Steam Dump*

The purpose of the low pressure steam dump (LPSD) system is to prevent turbine overspeed by discharging steam from the high pressure turbine exhaust to the condenser on turbine trip. The low pressure steam dump valves discharge steam to the condenser from the header between the high pressure turbine exhaust and the moisture separators. The system includes the steam dump valves, the steam dump stop valves, and associated piping, valves, instruments and controls.

*Main Turbine Generator*

The purpose of the main turbine generator (MTG) system is to receive steam from the steam generators, economically convert a portion of the thermal energy contained in the steam to electric energy, and provide extraction steam for feedwater heating.

The MTG system consists of the turbine, generator, and instrumentation. The turbine is a tandem-compound unit, comprising one high-pressure and three low-pressure cylinders. Steam is supplied to the high-pressure turbine through four control valves. The high-pressure turbine exhaust is directed to six moisture separator/reheaters, where the steam is dried and reheated. Three low-pressure turbines extract the energy in the reheated high-pressure turbine exhaust steam. The low-pressure turbines exhaust directly to the condensers. The generator is a direct-coupled, hydrogen-cooled, three-phase synchronous generator. The control valves, moisture separator/reheaters, condensers, and generator cooling components are not included in this system.

*Nuclear Equipment Drains*

The purpose of the nuclear equipment drains (NED) system is to collect leakage and drainage from various primary plant systems. The NED system includes piping and valves to collect leakage and drainage from the charging pumps and includes the piping, valves, instruments and controls to monitor the condensation from the containment fan cooler units. The drains from the fan cooler units are not needed to support the operation of the coolers.

*Process Radiation Monitoring*

The purpose of the process radiation monitoring (PRM) system is to monitor various fluid streams for indication of increasing radiation levels. This system consists of independent monitoring channels that are designed to detect the minimum concentrations of the isotopes of interest and, in monitoring gross activity, are designed to generate an alarm or automatic action under abnormal conditions.

The system includes radiation monitor channels comprised entirely of electrical components, and some with mechanical components used to transport a sample to and from the monitor.  Three of the monitoring channels with mechanical components have safety functions.

The PRM system also has the following intended functions for 10 CFR 54.4(a)(1).

- Support isolation of the containment purge and pressure relief line on high containment radiation.
- Provide containment isolation capability for lines penetrating containment.
- Support high control room radiation alarm for operator manual isolation of the control room HVAC system.

Components of the containment radiation monitoring channels are evaluated with containment penetrations (Section 2.3.2.5).  Components of the control room radiation monitoring channel are evaluated with the control room HVAC (Section 2.3.3.10).  A small number of components are evaluated with the component cooling water systems (Section 2.3.3.3).

*Primary Plant Sampling*

The purpose of the primary plant sampling (PS) system is to provide samples for laboratory analysis to evaluate reactor coolant and other reactor auxiliary systems chemistry during normal operation. The PS system includes piping, valves, sample coolers, instruments and controls necessary to collect and transport samples to the sample room.  The system also includes the post-accident reactor coolant sampling system, which provides a safe and accurate method of obtaining a pressurized coolant sample following an accident.

The PS system also has the following intended functions for 10 CFR 54.4(a)(1).

- Maintain the RCS pressure boundary (function performed by Class 1 RCS components that are part of this system code in the database).
- Provide containment isolation capability for lines penetrating containment.

A few of the components assigned this system code support the RHR system pressure boundary and are therefore evaluated with the RHR systems (Section 2.3.2.1). Components forming part of the safety injection system pressure boundary are evaluated with the safety injection systems (Section 2.3.2.4). Components that are part of the reactor coolant pressure boundary are evaluated with the reactor coolant system pressure boundary (Section 2.3.1.3). Components cooled by the CCW system are evaluated with the component cooling water systems (Section 2.3.3.3).

*River Water Service*

The purpose of the river water service system (RW) is to support the circulating water system, which provides cooling water from the Hudson River to the main condensers. The system includes various components that functionally support the circulating water (CW) system.

*Main Generator Seal Oil*

The purpose of the main generator seal oil (SO) system is to provide oil to seal the main generator shaft seals to prevent hydrogen leakage from the generator into the turbine building. The SO system includes pumps, oil coolers, tanks, piping, valves, instruments and controls to maintain a supply of oil to the generator shaft seals.

*Secondary Plant Sampling*

The purpose of the secondary plant sampling (SS) system is to provide samples for laboratory analysis to evaluate condensate, feedwater and main steam system chemistry during normal operation. The SS system includes piping, valves, sample coolers, instruments and controls necessary to collect and transport samples to the sample room.

*Turbine Hall Closed Cooling*

The purpose of the turbine hall closed cooling (THCC) system is to provide cooling water to various components in the turbine building and administration building, including condensate and heater drain pumps, main boiler feed pump pedestals, and station, instrument, and administration building air compressors. The THCC system includes circulating pumps, heat exchangers (cooled by service water), head tank, distribution piping valves, instruments and controls. Cooling water from the THCC system is not required to support any system safety function or any function for a regulated event.

*Vapor Containment Hydrogen Analyzer*

The purpose of the vapor containment hydrogen analyzer (VCHA) system is to provide hydrogen analyzers to monitor post-LOCA hydrogen concentration in the vapor containment atmosphere. Two hydrogen/oxygen analyzers have been installed to monitor the hydrogen and oxygen concentrations in the containment atmosphere. The system has a closed-loop flow path with the sampled air withdrawn from and discharged to the containment. Based on a recent license amendment (License Amendment No. 228), hydrogen monitoring is no longer required as a safety function; however, the system will remain available and will use the closed loop flow path with containment penetrations.

The VCHA system also has the following intended function for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.

Containment penetration components in this system code are evaluated with containment penetrations (Section 2.3.2.5).

UFSAR References

The following tables list the UFSAR references for systems described in this section.

| **Unit 2 System** | **UFSAR Section** |
|---|---|
| Chemical feed | Section 10.2.6.4 |
| Intake structure | None for mechanical components |
| Fresh water cooling | None |
| Main Generator | Section 8 |
| House Service Boiler | Section 9.6.5 |
| Ignition Oil | None |
| Integrated Liquid Waste Handling | Unit 1 SAR Section 3.7.3<br>Unit 2 UFSAR Section 11.1.2.1 |
| Miscellaneous | None |
| Nuclear Service Grade Makeup | Unit 1 SAR Section 3.7.2 |
| Post-Accident Containment Air Sample | Section 6.8.2.3 |
| Post-Accident Containment Vent (Retired In Place) | Section 6.8.2.2 |
| Primary Sampling | Section 9.4 |
| Radiation Monitoring | Section 11.2.3 |

| **Unit 2 System (Continued)** | **UFSAR Section** |
|---|---|
| River Water Service | None |
| Boiler Blowdown | Section 10.2.1.5 |
| Secondary sampling | Section 9.4 |
| Technical Support Center Diesel | None |
| Main Turbine | Section 10.2.2 |

| **Unit 3 System** | **UFSAR Section** |
|---|---|
| Ammonia / Morpholine Addition | Steam generator water chemistry is discussed in Section 10.2.6. |
| Auxiliary Steam and Condensate Return | Section 9.6.4 |
| Boron and Layup Chemical Addition | None |
| Chlorination | None |
| Circulating Water | Section 10.2.4 |
| Extraction Steam | Section 10.2 |
| Floor Drains | Sections 9.6.2.3 and 16.1.3 |
| Gaseous Waste Disposal | Sections 11.1 and 14.2.3 |
| Hydrazine Addition | Section 10.2.6 |
| Heater Drain/Moisture Separator Drain/Vent | Section 10.2.6 |
| Instrument Air Closed Cooling | Section 9.6.3 |
| Lube Oil | None |
| Low Pressure Steam Dump | None |
| Main Turbine Generator | Section 10.2 |
| Nuclear Equipment Drains | Sections 6.7.1.2 |
| Process Radiation Monitoring | Section 11.2.3.1 |
| Primary Plant Sampling | Section 9.4 |
| River Water Service System | Section 10.2.4 (circulating water system) |
| Main Generator Seal Oil | Section 10.2.2 |
| Secondary Plant Sampling | Section 9.4 |
| Turbine Hall Closed Cooling | None |
| Vapor Containment Hydrogen Analyzer | Section 6.8 |

Components Subject to Aging Management Review

For structural support, components subject to aging management review are those located between a safety-related/nonsafety-related interface and the structural boundary or other point that includes enough of the nonsafety-related piping run to conservatively include the components providing structural support to components with a safety function. These components are included in this evaluation if not included in another system review.

For spatial interaction, nonsafety-related components in a system determined to be in scope for 54.4(a)(2) for spatial interaction are subject to aging management review. Components are excluded from review if their location is such that no safety function can be impacted by component failure. Nonsafety-related components containing liquid or steam located in structures or areas containing safety-related equipment are subject to aging management review. Such components are included in this evaluation if not included in another system review.

The following tables provide additional information concerning areas or components excluded.

| IP2 System Code | Area or Components Excluded |
|---|---|
| ARDG (Appendix R Diesel Generator) | The Appendix R diesel generator is not yet installed for IP2; however, it will be installed in IP1 turbine hall. The ARDG system was not reviewed for 54.4(a)(2) for spatial interaction because all of the passive mechanical components were already included for (a)(1) or (a)(3) functions. |
| GT (Gas Turbine) | A review of the liquid-filled components that were not included in other aging management reviews identified that these components are located where they cannot affect equipment with safety functions. |
| HR (Hydrogen Recombiners) | There are no liquid-filled components in the HR system so there are no potential spatial effects |
| SEC (Security) | A review of the liquid-filled components that were not included in other aging management reviews identified that these components are located where they cannot affect equipment with safety functions. |
| WCPS (Weld Channel Pressurization) | A review of the components that were not included in other aging management reviews identified that these components contain air or gas only and cannot affect equipment with safety functions. |
| WW (Wash Water) | A review of the liquid-filled components that were not included in other aging management reviews identified that these components are located where they cannot affect equipment with safety functions. |

| IP3 System Code | Area or Components Excluded |
|---|---|
| ARDG (Appendix R Diesel Generator) | A review of the liquid-filled components that were not included in other aging management reviews identified that these components are located where they cannot affect equipment with safety functions. |
| BVS (Building Vent Sampling) | A review of the liquid-filled components that were not included in other aging management reviews identified that these components are located where they cannot affect equipment with safety functions. |
| CO2 (Carbon Dioxide) | A review of the components that were not included in other aging management reviews identified that these components contain air or gas only and cannot affect equipment with safety functions. |
| FBAR (Fire Barriers) | A review of the components that were not included in other aging management reviews identified that these components contain air or gas only and cannot affect equipment with safety functions. |
| FDA (Fire Detection and Alarms) | A review of the components that were not included in other aging management reviews identified that these components contain air or gas only and cannot affect equipment with safety functions. |
| FHS (Fuel Handling System) | A review of the components that were not included in other aging management reviews identified that these components contain air or gas only and cannot affect equipment with safety functions. |
| HVAC (Heating, Ventilation and Air Conditioning) | A review of the liquid-filled components that were not included in other aging management reviews identified that these components are located where they cannot affect equipment with safety functions. |
| ILRT (Integrated Leak Rate Testing) | A review of the liquid-filled components that were not included in other aging management reviews identified that these components are located where they cannot affect equipment with safety functions. |
| INCOR (Incore Nuclear Instrumentation) | A review of the components that were not included in other aging management reviews identified that these components contain air or gas only and cannot affect equipment with safety functions. |
| PAB (Primary Auxiliary Building) | A review of components that were not included in other aging management reviews identified that there are no other passive mechanical liquid-filled components. |
| PV (Plant Vent) | A review of components that were not included in other aging management reviews identified that there are no other passive mechanical liquid-filled components. |

| IP3 System Code | Area or Components Excluded |
|---|---|
| SECHV (Security Building HVAC) | A review of the components that were not included in other aging management reviews identified that these components contain air or gas only and cannot affect equipment with safety functions. |
| VCV (Vapor Containment Building Ventilation) | A review of components that were not included in other aging management reviews identified that there are no other passive mechanical liquid-filled components. |

The following database location codes contain no components that perform a safety function.

| IP1/IP2 Component Database Location Code | IP3 Component Database Location Code |
|---|---|
| ADMIN (IP1 Administration Building) | PC (IP3 Power Conversion Equipment Building) |
| ARS (IP2 Air Relief Structure) | PS (IP3 Security Building) |
| CP (IP2 Command Post) | RA (IP3 Radioactive Machine Shop) |
| CSB (IP1 Chemical Systems Building) | SE (IP3 Sewage Ejector Pit) |
| CWST (IP1 Metering House and City Water) | SG (IP3 Steam Generator Mockup Building) |
| DFPB (IP2 Diesel Fire Pump Building and Tank) | SO (IP3 Security Office Building) |
| DIP (IP2 De-icing Pump Pit) | SS (IP3 Switchyard Structures) |
| DT (IP1 Discharge Tunnel) | ST (IP3 Sewage Treatment Plant) |
| DVE (IP2 Deluge Valve Enclosure) | TD (IP3 Onsite Tech Support CTR Diesel) |
| EEC (IP2 Energy Education Center) | TF (IP3 Training Center Fire Pump House) |
| FSHB (IP1 Fuel Handling Building) | TR (IP3 Training Building) |
| FUTURE (IP1/IP2 Future Equipment) | TS (IP3 Technical Support Center) |
| GSB (Generation Support Building) | U2 (IP3 Unit 2 Personnel and Pipe Bridge) |
| GT1 (IP2 Gas Turbine #1) | UT (IP3 Utility Tunnel) |
| GT2 (IP2 Gas Turbine #2) | WH (IP3 Receiving Warehouse) |
| GT3 (IP2 Gas Turbine #3) | WP (IP3 Waste Holdup Pit) |
| HSB (IP1 House Service Boiler Building) | YD (IP3 Yard) |
| MOB (IP2 Maintenance and Outage Building) | |

| IP1/IP2 Component Database Location Code | IP3 Component Database Location Code |
|---|---|
| NCD (IP1 North Curtain Drain) | |
| ONSITE (IP2 Equipment Onsite) | |
| OTF (IP1 Fuel Oil Tank Farm) | |
| ROAD (IP1 Protected Area Road To Plant Entrance) | |
| SIM (IP2 Simulator Building) | |
| SUBSTATION A (IP1/IP2 Substation A) | |
| SWH (IP1 Screen Well House) | |
| TEST (IP2 Test) | |
| TSC (IP2 Tech Support Center) | |
| TYRD (IP2 Transformer Yard) | |
| WHUT (IP2 Waste Holdup Tank Area) | |
| VC (IP1 Vapor Containment) | |

The following IP2 systems were not reviewed for 54.4(a)(2) for spatial interaction because all of their passive mechanical components were already included because of other (a)(1), (a)(3), or other (a)(2) functions.

- AFW (Auxiliary Feedwater)
- CCF (Containment Cooling and Filtration)
- CCW (Component Cooling Water)
- CRD (Control Rod Drive)
- CSS (Containment Spray System)
- EP (Electrical Penetrations)
- FCCH (Fuel and Core Component Handling)
- ICI (In-Core Instrumentation)
- IVSW (Isolation Valve Seal Water)
- RHR (Residual Heat Removal)

The following IP3 systems were not reviewed for 54.4(a)(2) for spatial interaction because all of their passive mechanical components were already included because of other (a)(1), (a)(3), or other (a)(2) functions.

- AFW (Auxiliary Feedwater)

- CBHV (Control Building HVAC)
- CCW (Component Cooling Water)
- CRD (Control Rod Drive)
- CRHV (Control Room HVAC)
- ESS (Engineered Safeguards Initiation Logic)
- IVSW (Isolation Valve Seal Water)
- RHR (Residual Heat Removal)
- RPC (Reactor Protection and Control)
- SG (Steam Generator)
- SGLC (Steam Generator Level Control)
- SPG (Security Propane Generator)

Series 2.3.3-19-xx-IP2 and 2.3.3-19-xx-IP3 tables list component types that require aging management review for 10 CFR 54.4(a)(2) based on potential for physical interactions.

Series 3.3.2-19-xx-IP2 and 3.3.2-19-xx-IP3 tables provide the results of the aging management review for 10 CFR 54.4(a)(2) based on potential for physical interactions.

**Table 2.3.3-19-B-IP2**
**10 CFR 54.4(a)(2) Aging Management Review Tables**

| System Name | Series 2.3.3-19-xx-IP2 Table | Series 3.3.2-19-xx-IP2 Table |
|---|---|---|
| Auxiliary Steam | Table 2.3.3-19-1-IP2 | Table 3.3.2-19-1-IP2 |
| Conventional Closed Cooling | Table 2.3.3-19-2-IP2 | Table 3.3.2-19-2-IP2 |
| Chemical Feed | Table 2.3.3-19-3-IP2 | Table 3.3.2-19-3-IP2 |
| Condensate | Table 2.3.3-19-4-IP2 | Table 3.3.2-19-4-IP2 |
| Chemical and Volume Control | Table 2.3.3-19-5-IP2 | Table 3.3.2-19-5-IP2 |
| Circulating Water | Table 2.3.3-19-6-IP2 | Table 3.3.2-19-6-IP2 |
| City Water | Table 2.3.3-19-7-IP2 | Table 3.3.2-19-7-IP2 |
| Intake Structure | Table 2.3.3-19-8-IP2 | Table 3.3.2-19-8-IP2 |
| Emergency Diesel Generator | Table 2.3.3-19-9-IP2 | Table 3.3.2-19-9-IP2 |
| Fuel Oil | Table 2.3.3-19-10-IP2 | Table 3.3.2-19-10-IP2 |
| Fire Protection | Table 2.3.3-19-11-IP2 | Table 3.3.2-19-11-IP2 |

## Table 2.3.3-19-B-IP2
## 10 CFR 54.4(a)(2) Aging Management Review Tables (Continued)

| System Name | Series 2.3.3-19-xx-IP2 Table | Series 3.3.2-19-xx-IP2 Table |
|---|---|---|
| Feedwater | Table 2.3.3-19-12-IP2 | Table 3.3.2-19-12-IP2 |
| Fresh Water Cooling | Table 2.3.3-19-13-IP2 | Table 3.3.2-19-13-IP2 |
| Gas | Table 2.3.3-19-14-IP2 | Table 3.3.2-19-14-IP2 |
| Main Generator | Table 2.3.3-19-15-IP2 | Table 3.3.2-19-15-IP2 |
| House Service Boiler | Table 2.3.3-19-16-IP2 | Table 3.3.2-19-16-IP2 |
| Heating, Ventilation and Air Conditioning | Table 2.3.3-19-17-IP2 | Table 3.3.2-19-17-IP2 |
| Instrument Air | Table 2.3.3-19-18-IP2 | Table 3.3.2-19-18-IP2 |
| Instrument Air Closed Cooling | Table 2.3.3-19-19-IP2 | Table 3.3.2-19-19-IP2 |
| Ignition Oil | Table 2.3.3-19-20-IP2 | Table 3.3.2-19-20-IP2 |
| Integrated Liquid Waste Handling | Table 2.3.3-19-21-IP2 | Table 3.3.2-19-21-IP2 |
| Lube Oil | Table 2.3.3-19-22-IP2 | Table 3.3.2-19-22-IP2 |
| Main Steam | Table 2.3.3-19-23-IP2 | Table 3.3.2-19-23-IP2 |
| Miscellaneous | Table 2.3.3-19-24-IP2 | Table 3.3.2-19-24-IP2 |
| Nuclear Service Grade Makeup | Table 2.3.3-19-25-IP2 | Table 3.3.2-19-25-IP2 |
| Post-Accident Containment Air Sample | Table 2.3.3-19-26-IP2 | Table 3.3.2-19-26-IP2 |
| Post-Accident Containment Vent (retired in place) | Table 2.3.3-19-27-IP2 | Table 3.3.2-19-27-IP2 |
| Primary Sampling | Table 2.3.3-19-28-IP2 | Table 3.3.2-19-28-IP2 |
| Primary Water Makeup | Table 2.3.3-19-29-IP2 | Table 3.3.2-19-29-IP2 |
| Reactor Coolant System | Table 2.3.3-19-30-IP2 | Table 3.3.2-19-30-IP2 |
| Radiation Monitoring | Table 2.3.3-19-31-IP2 | Table 3.3.2-19-31-IP2 |
| River Water Service | Table 2.3.3-19-32-IP2 | Table 3.3.2-19-32-IP2 |

### Table 2.3.3-19-B-IP2
### 10 CFR 54.4(a)(2) Aging Management Review Tables (Continued)

| System Name | Series 2.3.3-19-xx-IP2 Table | Series 3.3.2-19-xx-IP2 Table |
|---|---|---|
| Station Air | Table 2.3.3-19-33-IP2 | Table 3.3.2-19-33-IP2 |
| Boiler Blowdown | Table 2.3.3-19-34-IP2 | Table 3.3.2-19-34-IP2 |
| Spent Fuel Pit Cooling | Table 2.3.3-19-35-IP2 | Table 3.3.2-19-35-IP2 |
| Steam Generator Blowdown | Table 2.3.3-19-36-IP2 | Table 3.3.2-19-36-IP2 |
| Safety Injection System | Table 2.3.3-19-37-IP2 | Table 3.3.2-19-37-IP2 |
| Secondary Sampling | Table 2.3.3-19-38-IP2 | Table 3.3.2-19-38-IP2 |
| Service Water | Table 2.3.3-19-39-IP2 | Table 3.3.2-19-39-IP2 |
| Technical Support Center Diesel | Table 2.3.3-19-40-IP2 | Table 3.3.2-19-40-IP2 |
| Main Turbine | Table 2.3.3-19-41-IP2 | Table 3.3.2-19-41-IP2 |
| Waste Disposal System | Table 2.3.3-19-42-IP2 | Table 3.3.2-19-42-IP2 |
| Water Treatment Plant | Table 2.3.3-19-43-IP2 | Table 3.3.2-19-43-IP2 |

### Table 2.3.3-19-B-IP3
### 10 CFR 54.4(a)(2) Aging Management Review Tables

| System Name | Series 2.3.3-19-xx-IP3 Table | Series 3.3.2-19-xx-IP3 Table |
|---|---|---|
| Ammonia / Morpholine Addition | Table 2.3.3-19-1-IP3 | Table 3.3.2-19-1-IP3 |
| Auxiliary Steam and Condensate Return | Table 2.3.3-19-2-IP3 | Table 3.3.2-19-2-IP3 |
| Boron and Layup Chemical Addition | Table 2.3.3-19-3-IP3 | Table 3.3.2-19-3-IP3 |
| Condenser Air Removal | Table 2.3.3-19-4-IP3 | Table 3.3.2-19-4-IP3 |
| Chlorination | Table 2.3.3-19-5-IP3 | Table 3.3.2-19-5-IP3 |
| Condensate | Table 2.3.3-19-6-IP3 | Table 3.3.2-19-6-IP3 |
| Condensate Polisher | Table 2.3.3-19-7-IP3 | Table 3.3.2-19-7-IP3 |

## Table 2.3.3-19-B-IP3
## 10 CFR 54.4(a)(2) Aging Management Review Tables (Continued)

| System Name | Series 2.3.3-19-xx-IP3 Table | Series 3.3.2-19-xx-IP3 Table |
|---|---|---|
| Condensate Pump Discharge | Table 2.3.3-19-8-IP3 | Table 3.3.2-19-8-IP3 |
| Condensate Pump Suction | Table 2.3.3-19-9-IP3 | Table 3.3.2-19-9-IP3 |
| Containment Spray | Table 2.3.3-19-10-IP3 | Table 3.3.2-19-10-IP3 |
| Chemical and Volume Control | Table 2.3.3-19-11-IP3 | Table 3.3.2-19-11-IP3 |
| Circulating Water | Table 2.3.3-19-12-IP3 | Table 3.3.2-19-12-IP3 |
| City Water Makeup | Table 2.3.3-19-13-IP3 | Table 3.3.2-19-13-IP3 |
| Condensate Transfer | Table 2.3.3-19-14-IP3 | Table 3.3.2-19-14-IP3 |
| Demineralized Water | Table 2.3.3-19-15-IP3 | Table 3.3.2-19-15-IP3 |
| Emergency Diesel Generator | Table 2.3.3-19-16-IP3 | Table 3.3.2-19-16-IP3 |
| Emergency Generators | Table 2.3.3-19-17-IP3 | Table 3.3.2-19-17-IP3 |
| Extraction Steam | Table 2.3.3-19-18-IP3 | Table 3.3.2-19-18-IP3 |
| Floor Drains | Table 2.3.3-19-19-IP3 | Table 3.3.2-19-19-IP3 |
| Fire Water | Table 2.3.3-19-20-IP3 | Table 3.3.2-19-20-IP3 |
| Fuel Storage Building HVAC | Table 2.3.3-19-21-IP3 | Table 3.3.2-19-21-IP3 |
| Feedwater | Table 2.3.3-19-22-IP3 | Table 3.3.2-19-22-IP3 |
| Main Feedwater Pump and Services | Table 2.3.3-19-23-IP3 | Table 3.3.2-19-23-IP3 |
| Gland Seal Steam | Table 2.3.3-19-24-IP3 | Table 3.3.2-19-24-IP3 |
| Gaseous Waste Disposal | Table 2.3.3-19-25-IP3 | Table 3.3.2-19-25-IP3 |
| Hydrazine Addition | Table 2.3.3-19-26-IP3 | Table 3.3.2-19-26-IP3 |
| Heater Drain / Moisture Separator Drains/Vents | Table 2.3.3-19-27-IP3 | Table 3.3.2-19-27-IP3 |
| High Pressure Steam Dump | Table 2.3.3-19-28-IP3 | Table 3.3.2-19-28-IP3 |
| Instrument Air | Table 2.3.3-19-29-IP3 | Table 3.3.2-19-29-IP3 |

## Table 2.3.3-19-B-IP3
## 10 CFR 54.4(a)(2) Aging Management Review Tables (Continued)

| System Name | Series 2.3.3-19-xx-IP3 Table | Series 3.3.2-19-xx-IP3 Table |
|---|---|---|
| Instrument Air Closed Cooling | Table 2.3.3-19-30-IP3 | Table 3.3.2-19-30-IP3 |
| Lube Oil | Table 2.3.3-19-31-IP3 | Table 3.3.2-19-31-IP3 |
| Low Pressure Steam Dump | Table 2.3.3-19-32-IP3 | Table 3.3.2-19-32-IP3 |
| Liquid Waste Disposal | Table 2.3.3-19-33-IP3 | Table 3.3.2-19-33-IP3 |
| Main Feedwater | Table 2.3.3-19-34-IP3 | Table 3.3.2-19-34-IP3 |
| Main Steam | Table 2.3.3-19-35-IP3 | Table 3.3.2-19-35-IP3 |
| Main Turbine Generator | Table 2.3.3-19-36-IP3 | Table 3.3.2-19-36-IP3 |
| Nitrogen | Table 2.3.3-19-37-IP3 | Table 3.3.2-19-37-IP3 |
| Nuclear Equipment Drains | Table 2.3.3-19-38-IP3 | Table 3.3.2-19-38-IP3 |
| Primary Auxiliary Building HVAC | Table 2.3.3-19-39-IP3 | Table 3.3.2-19-39-IP3 |
| Process Radiation Monitoring | Table 2.3.3-19-40-IP3 | Table 3.3.2-19-40-IP3 |
| Primary Plant Sampling | Table 2.3.3-19-41-IP3 | Table 3.3.2-19-41-IP3 |
| Primary Water Makeup | Table 2.3.3-19-42-IP3 | Table 3.3.2-19-42-IP3 |
| Pressurizer | Table 2.3.3-19-43-IP3 | Table 3.3.2-19-43-IP3 |
| Reactor Coolant System | Table 2.3.3-19-44-IP3 | Table 3.3.2-19-44-IP3 |
| Reheat Steam | Table 2.3.3-19-45-IP3 | Table 3.3.2-19-45-IP3 |
| Reactor Vessel Level Indication | Table 2.3.3-19-46-IP3 | Table 3.3.2-19-46-IP3 |
| River Water Service | Table 2.3.3-19-47-IP3 | Table 3.3.2-19-47-IP3 |
| Station Air | Table 2.3.3-19-48-IP3 | Table 3.3.2-19-48-IP3 |
| Spent Fuel Pit and Cooling | Table 2.3.3-19-49-IP3 | Table 3.3.2-19-49-IP3 |
| Steam Generator Blowdown | Table 2.3.3-19-50-IP3 | Table 3.3.2-19-50-IP3 |
| Steam Generator Blowdown Recovery | Table 2.3.3-19-51-IP3 | Table 3.3.2-19-51-IP3 |

### Table 2.3.3-19-B-IP3
### 10 CFR 54.4(a)(2) Aging Management Review Tables (Continued)

| System Name | Series 2.3.3-19-xx-IP3 Table | Series 3.3.2-19-xx-IP3 Table |
|---|---|---|
| Steam Generator Sampling | Table 2.3.3-19-52-IP3 | Table 3.3.2-19-52-IP3 |
| Safety Injection / Recirculation | Table 2.3.3-19-53-IP3 | Table 3.3.2-19-53-IP3 |
| Main Generator Seal Oil | Table 2.3.3-19-54-IP3 | Table 3.3.2-19-54-IP3 |
| Secondary Plant Sampling | Table 2.3.3-19-55-IP3 | Table 3.3.2-19-55-IP3 |
| Service Water | Table 2.3.3-19-56-IP3 | Table 3.3.2-19-56-IP3 |
| Turbine Generator Hydraulic Control | Table 2.3.3-19-57-IP3 | Table 3.3.2-19-57-IP3 |
| Turbine Hall Closed Cooling | Table 2.3.3-19-58-IP3 | Table 3.3.2-19-58-IP3 |
| Vapor Containment Hydrogen Analyzer | Table 2.3.3-19-59-IP3 | Table 3.3.2-19-59-IP3 |
| Vapor Containment Purge and Supply | Table 2.3.3-19-60-IP3 | Table 3.3.2-19-60-IP3 |
| Vapor Containment Pressure Relief | Table 2.3.3-19-61-IP3 | Table 3.3.2-19-61-IP3 |
| Weld Channel and Containment Penetration Pressurization | Table 2.3.3-19-62-IP3 | Table 3.3.2-19-62-IP3 |

#### License Renewal Drawings

None. The determination of whether a component meets the 10 CFR 54.4(a)(2) scoping criterion is based on where structural/seismic boundaries exist, or where the component is located in a building, whether it contains gas or liquid, and its proximity to equipment that supports a safety function. Providing drawings highlighting in-scope (a)(2) components would not provide significant additional information since the drawings do not indicate proximity of components to equipment with a safety function and do not identify structural/seismic boundaries. See Section 2.1.2.1.3 for further discussion of license renewal drawings.

### Table 2.3.3-1-IP2
### Spent Fuel Pit Cooling System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Neutron absorber (Boraflex) | Neutron absorption |

### Table 2.3.3-1-IP3
### Spent Fuel Pit Cooling System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Neutron absorber (Boral) | Neutron absorption |

### Table 2.3.3-2-IP2
### Service Water System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Expansion joint | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (bonnet) | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Indicator | Pressure boundary |
| Mixer | Pressure boundary |
| Orifice | Pressure boundary<br>Flow control |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Strainer | Filtration |
| Strainer housing | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary<br>Flow control |

### Table 2.3.3-2-IP3
### Service Water System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Expansion joint | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (bonnet) | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Indicator | Pressure boundary |
| Mixer | Pressure boundary |
| Orifice | Pressure boundary<br>Flow control |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Strainer | Filtration |
| Strainer housing | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary<br>Flow control |

### Table 2.3.3-3-IP2
### Component Cooling Water System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flex hose | Pressure boundary |
| Heat exchanger (bonnet) | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Heat exchanger (tubesheet) | Pressure boundary |
| Orifice | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-3-IP3
### Component Cooling Water System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flex hose | Pressure boundary |
| Heat exchanger (bonnet) | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Orifice | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-4-IP2
### Compressed Air System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flex hose | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-4-IP3
### Compressed Air System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flex hose | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.3-5-IP2
## Nitrogen System
## Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flex hose | Pressure boundary |
| Flow element | Flow control<br>Pressure boundary |
| Piping | Pressure boundary |
| Regulator | Pressure boundary |
| Strainer | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.3-5-IP3
## Nitrogen System
## Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flex hose | Pressure boundary |
| Orifice | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-6-IP2
### Chemical and Volume Control System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary<br>Flow control |
| Fluid drive housing | Pressure boundary |
| Heat exchanger (bonnet) | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Heat exchanger (tubesheet) | Pressure boundary |
| Piping | Pressure boundary |
| Pulsation dampener housing | Pressure boundary |
| Pump casing | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary<br>Flow control |

## Table 2.3.3-6-IP3
## Chemical and Volume Control System
## Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary<br>Flow control |
| Fluid drive housing | Pressure boundary |
| Heat exchanger (bonnet) | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Heat exchanger (tubesheet) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary<br>Flow control |

### Table 2.3.3-7-IP2
### Primary Water Makeup System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Flow control<br>Pressure boundary |
| Heat exchanger (tubes) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-7-IP3
### Primary Water Makeup System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Flow control<br>Pressure boundary |
| Heat exchanger (tubes) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-8-IP2
### Heating, Ventilation and Cooling Systems Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Damper housing | Pressure boundary |
| Duct | Pressure boundary |
| Duct flexible connection | Pressure boundary |
| Fan housing | Pressure boundary |
| Piping | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-8-IP3
### Heating, Ventilation and Cooling Systems Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Damper housing | Pressure boundary |
| Duct | Pressure boundary |
| Duct flexible connection | Pressure boundary |
| Fan housing | Pressure boundary |
| Piping | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.3-9-IP2
## Containment Cooling and Filtration System Components Subject to Aging Management Review

| **Component Type** | **Intended Function(s)** |
|---|---|
| Bolting | Pressure boundary |
| Damper housing | Pressure boundary |
| Duct | Pressure boundary |
| Duct flexible connection | Pressure boundary |
| Fan housing | Pressure boundary |
| Filter housing | Pressure boundary |
| Heat exchanger (fins) | Heat transfer |
| Heat exchanger (header) | Pressure boundary |
| Heat exchanger (housing) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Moisture separator | Filtration |
| Nozzle | Flow control |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-9-IP3
### Containment Cooling and Filtration System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Damper housing | Pressure boundary |
| Duct | Pressure boundary |
| Duct flexible connection | Pressure boundary |
| Fan housing | Pressure boundary |
| Filter housing | Pressure boundary |
| Heat exchanger (fins) | Heat transfer |
| Heat exchanger (header) | Pressure boundary |
| Heat exchanger (housing) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Moisture separator | Filtration |
| Nozzle | Flow control |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.3-10-IP2
## Control Room HVAC System
## Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Compressor housing | Pressure boundary |
| Damper housing | Pressure boundary |
| Drip pan | Pressure boundary |
| Duct | Pressure boundary |
| Duct flexible connection | Pressure boundary |
| Fan housing | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (fins) | Heat transfer |
| Heat exchanger (housing) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Louver housing | Pressure boundary |
| Piping | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-10-IP3
### Control Room HVAC System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Compressor housing | Pressure boundary |
| Damper housing | Pressure boundary |
| Drip pan | Pressure boundary |
| Duct | Pressure boundary |
| Duct flexible connection | Pressure boundary |
| Fan housing | Pressure boundary |
| Filter housing | Pressure boundary |
| Heat exchanger (fins) | Heat transfer |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Louver housing | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-11-IP2
### Fire Protection – Water System
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bolting | Pressure boundary |
| Expansion joint | Pressure boundary |
| Flow element | Flow control<br>Pressure boundary |
| Heater housing | Pressure boundary |
| Hydrant | Pressure boundary |
| Nozzle | Flow control<br>Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Silencer | Pressure boundary |
| Strainer | Filtration |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-11-IP3
### Fire Protection – Water System
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bolting | Pressure boundary |
| Expansion joint | Pressure boundary |
| Filter housing | Filtration<br>Pressure boundary |
| Flow element | Flow control<br>Pressure boundary |
| Heater housing | Pressure boundary |
| Hydrant | Pressure boundary |
| Nozzle | Flow control<br>Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Silencer | Pressure boundary |
| Strainer | Filtration |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-12-IP2
### Fire Protection – $CO_2$, Halon, and RCP Oil Collection Systems
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bolting | Pressure boundary |
| Drain pan | Pressure boundary |
| Flame arrestor | Flow control |
| Flex hose | Pressure boundary |
| Nozzle | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-12-IP3
### Fire Protection – $CO_2$, Halon, and RCP Oil Collection Systems
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bolting | Pressure boundary |
| Drain pan | Pressure boundary |
| Filter | Filtration |
| Filter housing | Pressure boundary |
| Flame arrestor | Flow control |
| Flex hose | Pressure boundary |
| Heat exchanger (tubes) | Pressure boundary |
| Nozzle | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-13-IP2
### Fuel Oil
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Flow control<br>Pressure boundary |
| Heat exchanger (tube) | Heat transfer<br>Pressure boundary |
| Heater housing | Pressure boundary |
| Orifice | Flow control<br>Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Strainer | Filtration |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-13-IP3
### Fuel Oil
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flame arrestor | Pressure boundary |
| Level gauge | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Strainer | Filtration |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-14-IP2
### Emergency Diesel Generator System
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Blower housing | Pressure boundary |
| Bolting | Pressure boundary |
| Duct | Pressure boundary |
| Duct flexible connection | Pressure boundary |
| Expansion joint | Pressure boundary |
| Filter housing | Pressure boundary |
| Heat exchanger (bonnet) | Pressure boundary |
| Heat exchanger (fins) | Heat transfer |
| Heat exchanger (housing) | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Heater housing | Pressure boundary |
| Lubricator housing | Pressure boundary |
| Orifice | Flow control<br>Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Silencer | Pressure boundary |
| Strainer | Filtration |
| Strainer housing | Pressure boundary |

### Table 2.3.3-14-IP2
### Emergency Diesel Generator System
### Components Subject to Aging Management Review
### (Continued)

| Component Type | Intended Function |
|---|---|
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Trap | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-14-IP3
### Emergency Diesel Generator System
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Blower housing | Pressure boundary |
| Bolting | Pressure boundary |
| Dryer | Pressure boundary |
| Duct | Pressure boundary |
| Duct flexible connection | Pressure boundary |
| Expansion joint | Pressure boundary |
| Filter housing | Pressure boundary |
| Heat exchanger (bonnet) | Pressure boundary |
| Heat exchanger (fins) | Heat transfer |
| Heat exchanger (housing) | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |

## Table 2.3.3-14-IP3
## Emergency Diesel Generator System
## Components Subject to Aging Management Review
## (Continued)

| Component Type | Intended Function |
|---|---|
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Heater housing | Pressure boundary |
| Lubricator housing | Pressure boundary |
| Orifice | Flow control<br>Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Silencer | Pressure boundary |
| Strainer | Filtration |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Trap | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.3-15-IP2
## Security Generator System
## Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flexible bellows | Pressure boundary |
| Heat exchanger (bonnet) | Pressure boundary |
| Heat exchanger (fins) | Heat transfer |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Piping | Pressure boundary |
| Silencer | Pressure boundary |
| Turbocharger | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-15-IP3
### Security Generator System
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flexible bellows | Pressure boundary |
| Flexible connection | Pressure boundary |
| Heat exchanger (bonnet) | Pressure boundary |
| Heat exchanger (fins) | Heat transfer |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Piping | Pressure boundary |
| Silencer | Pressure boundary |
| Tank | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-16-IP2
### SBO/Appendix R Diesel Generator System
### Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flexible connection | Pressure boundary |
| Heat exchanger (bonnet) | Pressure boundary |
| Heat exchanger (fins) | Heat transfer |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Heater housing | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Silencer | Pressure boundary |
| Tank | Pressure boundary |
| Turbocharger housing | Heat transfer<br>Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.3-16-IP3
## Appendix R Diesel Generator System
## Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Blower housing | Pressure boundary |
| Bolting | Pressure boundary |
| Compressor housing | Pressure boundary |
| Expansion joint | Pressure boundary |
| Filter housing | Pressure boundary |
| Heat exchanger (bonnet) | Pressure boundary |
| Heat exchanger (fins) | Heat transfer |
| Heat exchanger (housing) | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Heater housing | Pressure boundary |
| Lubricator housing | Pressure boundary |
| Motor housing | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Silencer | Pressure boundary |
| Strainer | Filtration |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |

### Table 2.3.3-16-IP3
### Appendix R Diesel Generator System
### Components Subject to Aging Management Review
### (Continued)

| Component Type | Intended Function |
|---|---|
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.3-17-IP2
## City Water System
## Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.3-17-IP3
## City Water System
## Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.3-18-IP2
## Plant Drains System
## Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Strainer | Filtration |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.3-18-IP3
## Plant Drains System
## Components Subject to Aging Management Review

| Component Type | Intended Function |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Strainer | Filtration |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.3-19-1-IP2
### Auxiliary Steam System
### Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flex joint | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heater housing | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Steam trap | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-2-IP2
## Conventional Closed Cooling System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Flex joint | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Orifice | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-3-IP2
## Chemical Feed System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Flex joint | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-4-IP2
# Condensate System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Blower housing | Pressure boundary |
| Bolting | Pressure boundary |
| Ejector | Pressure boundary |
| Expansion joint | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-5-IP2
# Chemical and Volume Control System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-6-IP2
# Circulating Water System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Expansion joint | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-7-IP2
## City Water System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-8-IP2
## Intake Structure System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Orifice | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-9-IP2
## Emergency Diesel Generator System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Compressor housing | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Tank | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-10-IP2
## Fuel Oil System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

### Table 2.3.3-19-11-IP2
### Fire Protection System
### Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Evacuator | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary |
| Piping | Pressure boundary |
| Sight glass | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-12-IP2
## Feedwater System
## Nonsafety-Related Components Potentially Affecting Safety Functions
## Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-13-IP2
# Fresh Water Cooling System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Compressor housing | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-14-IP2
# Gas System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Dryer | Pressure boundary |
| Filter housing | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-15-IP2
# Main Generator System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-16-IP2
## House Service Boiler System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Steam trap | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Turbine housing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-17-IP2
# Heating, Ventilation and Air Conditioning Systems
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Damper housing | Pressure boundary |
| Duct | Pressure boundary |
| Filter housing | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-18-IP2
# Instrument Air System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Compressor housing | Pressure boundary |
| Dryer | Pressure boundary |
| Filter housing | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Silencer | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Trap | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-19-IP2
## Instrument Air Closed Cooling System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-20-IP2
# Ignition Oil System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-21-IP2
# Integrated Liquid Waste Handling System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Tank | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

### Table 2.3.3-19-22-IP2
### Lube Oil System
### Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flex hose | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Orifice | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

### Table 2.3.3-19-23-IP2
### Main Steam System
### Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Expansion joint | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Orifice | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Silencer | Pressure boundary |
| Steam trap | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Turbine housing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-24-IP2
# Miscellaneous System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-25-IP2
## Nuclear Service Grade Makeup System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-26-IP2
## Post-Accident Containment Air Sampling System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Gas analyzer | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-27-IP2
# Post-Accident Containment Vent System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-28-IP2
## Primary Sampling System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

### Table 2.3.3-19-29-IP2
### Primary Water Makeup System
### Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function[1]** |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary |
| Piping | Pressure boundary |
| Sight glass | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-30-IP2
## Reactor Coolant System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Rupture disk | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-31-IP2
# Radiation Monitoring System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-32-IP2
## River Water Service System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Strainer housing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-33-IP2
# Station Air System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Compressor housing | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-34-IP2
## Boiler Blowdown System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-35-IP2
## Spent Fuel Pit Cooling System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Expansion joint | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-36-IP2
## Steam Generator Blowdown System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-37-IP2
# Safety Injection System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Tank | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-38-IP2
## Secondary Sampling System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-39-IP2
## Service Water System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Strainer housing | Pressure boundary |
| Thermowell | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-40-IP2
# Technical Support Center Diesel System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-41-IP2
## Main Turbine System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Turbine housing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

### Table 2.3.3-19-42-IP2
### Waste Disposal System
### Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-43-IP2
# Water Treatment Plant System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-1-IP3
# Ammonia / Morpholine System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

### Table 2.3.3-19-2-IP3
### Auxiliary Steam and Condensate Return System
### Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Heater housing | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Steam trap | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-3-IP3
# Boron and Layup Chemical Addition System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

### Table 2.3.3-19-4-IP3
### Condenser Air Removal System
### Nonsafety-Related Components Potentially Affecting Safety Functions
### Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Ejector | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Steam trap | Pressure boundary |
| Tank | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-5-IP3
# Chlorination System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-6-IP3
## Condensate System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-7-IP3
## Condensate Polisher System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-8-IP3
## Condensate Pump Discharge System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-9-IP3
# Condensate Pump Suction System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Thermowell | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-10-IP3
# Containment Spray System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

### Table 2.3.3-19-11-IP3
### Chemical and Volume Control System
### Nonsafety-Related Components Potentially Affecting Safety Functions
### Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-12-IP3
# Circulating Water System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Expansion joint | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-13-IP3
## City Water Makeup System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Strainer housing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-14-IP3
# Condensate Transfer System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Ejector | Pressure boundary |
| Expansion joint | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-15-IP3
## Demineralized Water System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-16-IP3
# Emergency Diesel Generator System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-17-IP3
## Emergency Generator System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-18-IP3
## Extraction Steam System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Expansion joint | Pressure boundary |
| Orifice | Pressure boundary |
| Piping | Pressure boundary |
| Steam trap | Pressure boundary |
| Strainer housing | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-19-IP3
# Floor Drains System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-20-IP3
# Fire Water System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-21-IP3
# Fuel Storage Building HVAC System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-22-IP3
## Feedwater System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-23-IP3
# Main Feedwater Pump and Service System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Expansion joint | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Steam trap | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Turbine housing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-24-IP3
## Gland Seal System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Rupture disk | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

### Table 2.3.3-19-25-IP3
### Gaseous Waste Disposal System
### Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Compressor housing | Pressure boundary |
| Orifice | Pressure boundary |
| Piping | Pressure boundary |
| Sight glass | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-26-IP3
## Hydrazine Addition System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Tank | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-27-IP3
# Heater Drain/Moisture Separator Drains/Vents System Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Expansion joint | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Orifice | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-28-IP3
## High Pressure Steam Dump System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-29-IP3
## Instrument Air System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Compressor housing | Pressure boundary |
| Dryer | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Silencer | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Trap | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-30-IP3
## Instrument Air Closed Cooling System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-31-IP3
## Lube Oil System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heater housing | Pressure boundary |
| Orifice | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

### Table 2.3.3-19-32-IP3
### Low Pressure Steam Dump System
### Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Steam trap | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-33-IP3
# Liquid Waste Disposal System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

### Table 2.3.3-19-34-IP3
### Main Feedwater System
### Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-35-IP3
## Main Steam System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Orifice | Pressure boundary |
| Piping | Pressure boundary |
| Silencer | Pressure boundary |
| Steam trap | Pressure boundary |
| Strainer housing | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-36-IP3
# Main Turbine Generator System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Rupture disk | Pressure boundary |
| Turbine housing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-37-IP3
## Nitrogen System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |
| Vaporizer | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-38-IP3
## Nuclear Equipment Drains System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-39-IP3
# Primary Auxiliary Building HVAC System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Damper housing | Pressure boundary |
| Duct | Pressure boundary |
| Filter housing | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-40-IP3
## Process Radiation Monitoring System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-41-IP3
# Primary Plant Sampling System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-42-IP3
# Primary Water Makeup System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-43-IP3
## Pressurizer System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Rupture disk | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-44-IP3
# Reactor Coolant System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-45-IP3
# Reheat Steam System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Steam trap | Pressure boundary |
| Strainer housing | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-46-IP3
## Reactor Vessel Level Indication System Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-47-IP3
## River Water Service System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Thermowell | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-48-IP3
# Station Air System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Compressor housing | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-49-IP3
## Spent Fuel Pit and Cooling System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-50-IP3
## Steam Generator Blowdown System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Eductor | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-51-IP3 Steam Generator Blowdown Recovery System Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-52-IP3
# Steam Generator Sampling System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-53-IP3
# Safety Injection / Recirculation System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Strainer housing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-54-IP3
## Main Generator Seal Oil System
## Nonsafety-Related Components Potentially Affecting Safety Functions
## Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Orifice | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-55-IP3
## Secondary Plant Sampling System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

### Table 2.3.3-19-56-IP3
### Service Water System
### Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Filter housing | Pressure boundary |
| Flow element | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-57-IP3
## Turbine Generator Hydraulic Control System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Orifice | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-58-IP3
# Turbine Hall Closed Cooling System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Flex joint | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Orifice | Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-59-IP3
# Vapor Containment Hydrogen Analyzer System Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Gas analyzer | Pressure boundary |
| Piping | Pressure boundary |
| Tank | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-60-IP3
# Vapor Containment Purge and Supply System
# Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Damper housing | Pressure boundary |
| Duct | Pressure boundary |
| Filter housing | Pressure boundary |
| Piping | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

## Table 2.3.3-19-61-IP3
## Vapor Containment Pressure Relief System
## Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| Component Type | Intended Function[1] |
|---|---|
| Bolting | Pressure boundary |
| Duct | Pressure boundary |
| Filter housing | Pressure boundary |
| Piping | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

# Table 2.3.3-19-62-IP3
# Weld Channel and Containment Penetration Pressurization System Nonsafety-Related Components Potentially Affecting Safety Functions Subject to Aging Management Review

| **Component Type** | **Intended Function**[1] |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

1. For component types included under 10 CFR 54.4(a)(2), the intended function of pressure boundary includes providing structural/seismic support for components that are included for nonsafety-related SSCs directly connected to safety-related SSCs.

### 2.3.4 Steam and Power Conversion Systems

The following systems are included in this section.

- Main Steam
- Main Feedwater
- Auxiliary Feedwater
- Steam Generator Blowdown
- IP2 AFW Pump Room Fire Event
- Condensate

### 2.3.4.1 Main Steam

System Description

*Unit 2*

The purpose of the main steam (MS) system is to conduct steam from the four steam generators inside the containment structure to the turbine generator unit in the turbine generator building. The system has four main steam pipes, one from each steam generator to the turbine stop and control valves. The four lines are interconnected near the turbine. Each steam pipe has a main steam isolation value (MSIV) and a non-return valve located outside the containment. There are five code safety valves and one power-operated relief valve on each main steam line outside the reactor containment and upstream of the isolation and non-return valves.

A flow venturi upstream of the isolation valve measures steam flow. Steam pressure is also measured upstream of the isolation valve. The main steam system supplies steam to the main boiler feedwater pump turbines and the auxiliary feedwater pump turbine.

The main boiler feedwater pump turbines are included in the main steam system. The main steam system includes the turbine steam bypass system and the low pressure steam dump system, which channel excess steam flow to the condenser. There are MS system components in the steam generator blowdown flowpath.

The MS system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide steam generator (SG) overpressure protection via the main steam safety valves.
- Limit steam release and provide secondary side isolation capability to limit RCS cooldown following a steam line rupture.
- Provide isolation capability during a primary-to-secondary leak or steam generator tube rupture.
- Provide capability to cool down RCS via steam discharge to atmosphere.
- Support containment boundary as a closed system extension of the containment.
- Provide steam to the steam-driven auxiliary feedwater pump under certain accident conditions.

The MS system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The MS system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide capability to cool down RCS via steam discharge to atmosphere for the Appendix R event (10 CFR 50.48) or for station blackout (10 CFR 50.63).
- Provide the capability to isolate steam flow should the main steam isolation valves be inoperable following an Appendix R event (10 CFR 50.48).
- Support safe shutdown in the event of a fire in the auxiliary feed pump room (10 CFR 50.48) (see Section 2.3.4.5).
- Provide steam to the steam-driven auxiliary feedwater pump during a station blackout (10 CFR 50.63) or Appendix R event (10 CFR 50.48).

### *Unit 3*

For Unit 3, the main steam evaluation includes the following systems: main steam, auxiliary steam and condensate return, condenser air removal, gland seal steam, high pressure steam dump, reactor protection and control, reheat steam, and turbine generator hydraulic control.

#### *Main Steam*

The purpose of the main steam (MS) system is to conduct steam from the four steam generators inside the containment structure to the turbine generator unit in the turbine generator building. The system has four main steam pipes, one from each steam generator to the turbine stop and control valves. The four lines are interconnected near the turbine. Each steam pipe has a main steam isolation valve (MSIV) and a non-return valve located outside the containment. There are five code safety valves and one power-operated relief valve on each main steam line outside the reactor containment and upstream of the isolation and non-return valves.

A flow venturi upstream of the isolation valve measures steam flow. Steam pressure is also measured upstream of the isolation valve. The main steam system supplies steam to the main boiler feedwater pump turbines and the auxiliary feedwater pump turbine.

The main boiler feedwater pump turbines are included in the main steam system. The main steam system includes the turbine steam bypass system and the low pressure steam dump system, which channel excess steam flow to the condenser. There are MS system components in the steam generator blowdown flowpath.

The MS system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide steam generator (SG) overpressure protection via the main steam safety valves.
- Limit steam release and provide secondary side isolation capability to limit RCS cooldown following a steam line rupture.
- Provide isolation capability during a primary-to-secondary leak or steam generator tube rupture.

- Provide capability to cool down RCS via steam discharge to atmosphere.
- Support containment boundary as a closed system extension of the containment.
- Provide steam to the steam-driven auxiliary feedwater pump under certain accident conditions.

The MS system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The MS system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide capability to cool down RCS via steam discharge to atmosphere for the Appendix R event (10 CFR 50.48) or for station blackout (10 CFR 50.63).
- Provide steam to the steam-driven auxiliary feedwater pump during a station blackout (10 CFR 50.63) or Appendix R event (10 CFR 50.48).
- Provide the capability to isolate steam flow should the main steam isolation valves be inoperable following an Appendix R event (10 CFR 50.48).

*Auxiliary Steam and Condensate Return*

The purpose of the auxiliary steam and condensate return (ASC) system is to provide auxiliary steam to various plant components for the purpose of heating for IP3 and to recover condensate via the associated condensate return lines. The system supplies heating steam throughout the plant including room and area heating units, refueling water and primary water storage tanks, boric acid batch mixing tank, etc. The system also supplies other minor steam loads such as the condenser waterbox air ejectors. The system is supplied by the house service boiler or steam reboiler and includes heaters, air ejectors, steam distribution piping and valves, condensate return piping, valves, pumps, tanks, controls and instruments.

The ASC system has no intended functions for 10 CFR 54.4(a)(1).

The ASC system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The ASC system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide the capability to isolate steam flow should the main steam isolation valves be inoperable following an Appendix R event (10 CFR 50.48).

*Condenser Air Removal*

The purpose of the condenser air removal (CAR) system is to remove air and non-condensable gasses from the condensers to prevent the buildup of gas that would interfere with the condensing of steam in the condenser. For each condenser, one four-element, two-stage air ejector with separate inter-condenser and common after-condensers is provided. For normal air removal, one air ejector unit is required per condenser. For initial condenser shell side air removal, three non-condensing priming ejectors are provided. The ejectors function by using steam from the main steam system supplied through a pressure reducing valve. The air ejector exhaust is monitored for radioactivity. In the event of a steam generator leak and the subsequent presence of radioactive contaminated steam in the secondary system, the radioactive non-condensable gases that concentrate in the air ejector effluent will be detected by this radiation monitor. A high activity level signal automatically diverts the exhaust gases from the vent stack to the containment.

The CAR system has the following intended function for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.

The CAR system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The CAR system has the following intended function for 10 CFR 54.4(a)(3).

- Provide the capability to isolate main steam to the steam jet air ejectors and priming air ejectors if MSIVs cannot be closed due to a fire (10 CFR 50.48).

*Gland Seal Steam*

The purpose of the gland seal steam (GSS) system is to provide steam to the main turbine and boiler feedwater pump turbine gland seals. The system includes pressure regulating valves and distribution piping and valves.

The GSS system has no intended functions for 10 CFR 54.4(a)(1).

The GSS system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The GSS system has the following intended function for 10 CFR 54.4(a)(3).

- Provide the capability to isolate steam flow should the main steam isolation valves be inoperable following an Appendix R event (10 CFR 50.48).

*High Pressure Steam Dump*

The purpose of the high pressure steam dump (HPSD) system is to provide a main steam flowpath bypassing the turbine to the main condenser when the turbine generator is unable to accept the steam flow. Excess steam is bypassed when necessary from the four main steam lines ahead of the turbine stop valves directly to the condensers by means of two main steam bypass lines, one on either side of the turbine. From each of the main steam bypass lines, six lines, each with a bypass control valve, discharge into the condenser. The system includes the bypass control valves and the associated piping, controls and instruments.

The HPSD system has no intended functions for 10 CFR 54.4(a)(1).

The HPSD system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The HPSD system has the following intended function for 10 CFR 54.4(a)(3).

- Provide the capability to isolate steam flow through the turbine via the high pressure steam dump valves should the MSIVs become inoperable following an Appendix R event.

*Reactor Protection and Control*

The purpose of the RPC system is to monitor primary and secondary plant parameters and to provide a reactor trip to protect the reactor core and reactor coolant system. The RPC system is primarily an electrical system, but it does include a small number of mechanical instrumentation components that form part of the steam generator secondary side pressure boundary.

The RPC system has the following mechanical intended function for 10 CFR 54.4(a)(1).

- Maintain steam generator secondary side pressure boundary.

The RPC system has no intended functions for 10 CFR 54.4(a)(2) or (a)(3).

### *Reheat Steam*

The purpose of the reheat steam (RS) system is to provide reheated steam to the low pressure turbines and to provide steam to the main boiler feedwater pump turbines from main steam. Steam from the high pressure turbine exhaust passes through the moisture separator reheaters where moisture is removed and the steam is reheated by main steam extracted before the turbine main steam stop valves. Part of the extracted main steam feeds the main boiler feedwater pump turbines. The system includes the moisture separator reheaters, piping, valves, instruments and controls.

The RS system has no intended functions for 10 CFR 54.4(a)(1).

The RS system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The RS system has the following intended function for 10 CFR 54.4(a)(3).

- Support the capability to isolate main steam to the moisture separator reheaters if MSIVs cannot be closed due to a fire.

### *Turbine Generator Hydraulic Control*

The purpose of the turbine generator hydraulic control (TGHC) system is to provide direct control of the main turbine. The system includes electrical and mechanical components of the turbine hydraulic control system, including the main turbine stop valves. The main turbine stop valves provide a part of the main steam system pressure boundary for Appendix R safe shutdown.

The TGHC system has no intended functions for 10 CFR 54.4(a)(1).

The TGHC system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The TGHC system has the following intended function for 10 CFR 54.4(a)(3).

- Provide a means to trip and/or isolate steam to the main turbine (via turbine stop valves) following an Appendix R event (10 CFR 50.48).

UFSAR References

Unit 2: Section 10.2

Unit 3:

| | |
|---|---|
| MS | Section 10.2 |
| ASC | Section 9.6.4 |
| CAR | Section 10.2.5 |
| HPSD | Section 10.2.1 |
| RPC | Section 7.2 |
| RS | Section 10.2 |
| TGHC | Section 10.2.2 |

Components Subject to Aging Management Review

*Unit 2*

MS components in the SGBD flowpath are evaluated with the steam generator blowdown system (Section 2.3.4.4). Components supporting the auxiliary feedwater (AFW) system are evaluated with that system (Section 2.3.4.3). Components that support safe shutdown in the event of a fire in the auxiliary feed pump room are evaluated in Section 2.3.4.5. A small number of components are evaluated with the compressed air systems (Section 2.3.3.4). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

*Unit 3*

MS components supporting the AFW system are evaluated with the auxiliary feedwater systems (Section 2.3.4.3). Components containing air are evaluated with the compressed air systems (Section 2.3.3.4). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining MS system components are reviewed as listed below.

Nonsafety-related ASC components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). ASC components that form part of the main steam pressure boundary are reviewed as listed below.

CAR system components in the containment penetration are evaluated with containment penetrations (Section 2.3.2.5). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). CAR system components used to isolate main steam in the event of a fire are reviewed as listed below.

Nonsafety-related GSS components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). GSS components that form part of the main steam pressure boundary are reviewed as listed below.

Nonsafety-related HPSD components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). HPSD components required to isolate for Appendix R safe shutdown are reviewed as listed below.

RPC components supporting the mechanical intended function are evaluated with the steam generators (Section 2.3.1.4) or as listed below.

Nonsafety-related RS components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). RS system components supporting the capability to isolate moisture separator reheaters are reviewed as listed below.

Nonsafety-related TGHC components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). TGHC turbine stop valves are reviewed as listed below.

Table 2.3.4-1-IP2 and Table 2.3.4-1-IP3 list the component types that require aging management review.

Table 3.4.2-1-IP2 and Table 3.4.2-1-IP3 provide the results of the aging management review.

License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

| *Unit 2* | *Unit 3* |
|---|---|
| LRA-9321-F-2017 | LRA-9321-F-20173 |
| LRA-9321-F-2041 | LRA-9321-F-20313 |

LRA-9321-F-2042
LRA-227780
LRA-A235308
LRA-9321-F-20413
LRA-9321-F-20423
LRA-9321-F-41283

### 2.3.4.2 Main Feedwater

System Description

*Unit 2*

The purpose of the main feedwater (FW) system is to transfer condensate and heater drain flow through the final stage of feedwater heating to the steam generators. Two half-size steam-driven main feedwater pumps increase the pressure of the condensate for delivery through the final stage of feedwater heating and then the feedwater regulating valves to the steam generators.

The FW system includes the high pressure feedwater heaters, the steam generators, and the piping and valves from the outlet of the main feed pumps through the heaters to the steam generators. The FW system also includes the main feed pump turbine drip tank drain pumps. The main feed pumps are part of the condensate system and the main feed pump turbines are part of the main steam system.

The FW system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide capability to automatically isolate feedwater flow to the steam generators (SGs) following certain transient, emergency, and faulted conditions.
- Provide flow paths for the delivery of auxiliary feedwater (AFW) to the SGs following transients and accidents requiring actuation of the AFW System.
- Provide primary-to-secondary heat transfer (steam generators).
- Provide part of the reactor coolant pressure boundary (steam generators).
- Maintain secondary system pressure boundary to support primary heat removal (steam generators).
- Support containment boundary as a closed system extension of the containment.

The FW system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The FW system has the following intended functions for 10 CFR 54.4(a)(3).

- The FW system is credited in the Appendix R safe shutdown analysis for fire protection (10 CFR 50.48).
- Support safe shutdown in the event of a fire in the auxiliary feed pump room (10 CFR 50.48) (see Section 2.3.4.5).

<u>Unit 3</u>

The purpose of the feedwater system, which includes the feedwater (FW), main feedwater (MFW), and main feedwater pumps and services (FWP) system codes, is to transfer condensate and heater drain flow through the final stage of feedwater heating to the steam generators. Two half-size steam-driven main feedwater pumps increase the pressure of the condensate for delivery through the final stage of feedwater heating and then the feedwater regulating valves to the steam generators.

*Main Feedwater*

The MFW system includes the high pressure feedwater heaters and piping and valves from the main feed pumps through the heaters to the steam generators.

The MFW system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide capability to isolate feedwater flow to the steam generators.
- Provide capability to isolate backflow from the auxiliary feedwater system.
- Support containment boundary as a closed system extension of the containment.

The MFW system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The MFW system has the following intended function for 10 CFR 54.4(a)(3).

- Provide flow paths for the delivery of auxiliary feedwater to the steam generators during station blackout and Appendix R events (10 CFR 50.48).

*Feedwater*

The FW system includes miscellaneous feedwater-related components. All of the mechanical components are instrumentation valves on the auxiliary feedwater system.

The FW system has the following intended function for 10 CFR 54.4(a)(1).

- Support the auxiliary feedwater system pressure boundary.

The FW system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The FW system has no intended function for 10 CFR 54.4(a)(3).

*Main Feedwater Pumps and Services*

The purpose of the FWP system is to support the main feedwater system by increasing the pressure of the condensate for delivery through the final stage of feedwater heating and then the feedwater regulating valves to the steam generators. The system includes the main feed pumps, the main feed pump turbines, and their associated support equipment.

The FWP system has no intended functions for 10 CFR 54.4(a)(1) or (a)(3).

The FWP system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

UFSAR References

Unit 2: Section 10.2.6

Unit 3: Section 10.2.6

Components Subject to Aging Management Review

*Unit 2*

The steam generators and secondary side instrumentation piping and valves are evaluated with the steam generators (Section 2.3.1.4). Components that support safe shutdown in the event of a fire in the auxiliary feed pump room are evaluated in Section 2.3.4.5. System components containing air are evaluated with the compressed air systems (Section 2.3.3.4). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining feedwater system components are reviewed as listed below.

*Unit 3*

Components of the FW system supporting the auxiliary feedwater system are evaluated with the auxiliary feedwater systems (Section 2.3.4.3). For FW, MFW, and FWP systems, nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components of MFW are reviewed as listed below.

Table 2.3.4-2-IP2 and Table 2.3.4-2-IP3 list the component types that require aging management review.

Table 3.4.2-2-IP2 and Table 3.4.2-2-IP3 provide the results of the aging management review.

License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

| *Unit 2* | *Unit 3* |
|---|---|
| LRA-9321-2019-0 | LRA-9321-20193-0 |

### 2.3.4.3 Auxiliary Feedwater

<u>System Description</u>

*<u>Unit 2</u>*

The purpose of the auxiliary feedwater (AFW) system is to ensure that adequate feedwater is supplied to the steam generators for removing reactor decay heat under all circumstances, including loss of power and normal heat sink (e.g., condenser isolation or loss of circulating water flow). Major components of the system include the condensate storage tank (CST) and the three auxiliary feedwater pumps, one steam-turbine-driven and two electric-motor-driven. Diverse auxiliary feedwater supplies are provided by using two pumping systems using different sources of motive power for the pumps. Each system supplies auxiliary feedwater to all four steam generators. The steam-turbine-driven pump is capable of being supplied from two of the steam generators. The auxiliary feedwater system is used during plant startup at low power levels before the main feedwater pump is available.

The condensate storage tank is the safety-grade water source for the system. A minimum water level maintained in the condensate storage tank assures an adequate inventory. The auxiliary feedwater pumps can draw from an alternative supply of water to provide for long-term cooling. This alternative supply is from the city water storage tank.

The AFW system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide a flow path from the CST via the auxiliary feedwater pumps to the steam generators for decay heat removal under accident conditions.
- Provide capability to isolate the CST from the condensate system to maintain a dedicated water supply.

The AFW system has no intended function for 10 CFR 54.4(a)(2).

The AFW system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide a flow path from the CST to the SGs for decay heat removal via the steam-driven auxiliary feedwater pump during station blackout (10 CFR 50.63) and via all auxiliary feedwater pumps during Appendix R events (10 CFR 50.48).
- Provide a flow path from the CST via the auxiliary feedwater pumps to the SGs during an ATWS event (10 CFR 50.62).

*<u>Unit 3</u>*

The purpose of the AFW system is to provide a flow of water from the condensate storage tank to the steam generators when the main feedwater pumps are unavailable. One steam turbine-driven and two electric motor-driven auxiliary feedwater pumps ensure that adequate feedwater is supplied to the steam generators for removing reactor decay heat under all circumstances, including loss of power and normal heat sink (e.g., condenser isolation or loss of circulating water flow). All four steam generators can be supplied with auxiliary feedwater. The steam-turbine-driven pump is capable of being supplied from two of the steam generators. The auxiliary feedwater system is used during plant startup at low power levels before the main feedwater pump is available.

The system includes the auxiliary feedwater pumps and the turbine for the turbine-driven pump, piping from both the condensate storage tank and city water supply (an alternate source) through the pumps to the feedwater line supplying the steam generators, valves, instruments and controls. The system does not include the condensate storage tank, which is part of the condensate transfer system.

The AFW system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide a flow path from the condensate storage tank (CST) via the auxiliary feedwater pumps to the steam generators (SGs) for decay heat removal under accident conditions.

The AFW system has no intended functions for 10 CFR 54.4(a)(2).

The AFW system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide a flow path from the CST via the steam-driven auxiliary feedwater pump to the steam generators for decay heat removal during station blackout (10 CFR 50.63) and Appendix R (10 CFR 50.48) events.
- Provide a flow path from the CST via the auxiliary feedwater pumps to the steam generators during an ATWS event (10 CFR 50.62).

UFSAR References

Unit 2: Section 10.2.6.3

Unit 3: Sections 7.2.2, 10.2.6

Components Subject to Aging Management Review

*Unit 2*

Instrument air components included in the AFW system code are evaluated with the compressed air systems (Section 2.3.3.4). A small number of components are evaluated with the city water system (Section 2.3.3.17). Remaining components are reviewed as listed below.

*Unit 3*

Instrument air components included in the AFW system code are evaluated with the compressed air systems (Section 2.3.3.4). Remaining components are reviewed as listed below.

Table 2.3.4-3-IP2 and Table 2.3.4-3-IP3 list the component types that require aging management review.

Table 3.4.2-3-IP2 and Table 3.4.2-3-IP3 provide the results of the aging management review.

License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings

| *Unit 2* | *Unit 3* |
|---|---|
| LRA-9321-2017 | LRA-9321-20173 |
| LRA-9321-2018 | LRA-9321-20183 |
| LRA-9321-2019 | LRA-9321-20193 |
| LRA-9321-2038 | LRA-9321-20383 |
| LRA-9321-2041 | LRA-9321-20413 |
| LRA-9321-4006 | LRA-9321-27233 |
| LRA-250073 | |

### 2.3.4.4 Steam Generator Blowdown

System Description

*Unit 2*

The purpose of the steam generator blowdown (SGBD) system is to provide blowdown capability to control the concentration of solids in the shell side of the steam generators. The system is normally operating with a continuous blowdown and sample flow. The SGBD system includes a drain connection and two blowdown connections (nozzles) at the bottom of each steam generator. Piping from the connections (nozzles) join to form a stainless steel blowdown header. Four individual blowdown headers are routed from the respective steam generator to the primary auxiliary building through containment isolation valves. The blowdown flows are normally routed to the flash tank. The flashed vapor is discharged to the atmosphere while the condensate drains by gravity through a service water discharge line into the circulating water discharge canal. The sample flows are combined, cooled, and monitored for radiation.

The SGBD system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.
- Isolate blowdown upon a loss of feedwater to prevent loss of secondary inventory.

The SGBD system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The SGBD system has the following intended function for 10 CFR 54.4(a)(3).

- Isolate the blowdown during the shutdown/cooldown when AFW is actuated for fire (10 CFR 50.48), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

*Unit 3*

The Unit 3 evaluations of steam generator blowdown includes the following systems: steam generator blowdown, steam generator blowdown recovery, and steam generator sampling.

*Steam Generator Blowdown*

The purpose of the SGBD system is to provide blowdown capability to control the concentration of solids in the shell side of the steam generators. The system is normally operating with a continuous blowdown and sample flow. The SGBD system includes a drain connection and two blowdown connections (nozzles) at the bottom of each steam generator. Piping from the connections (nozzles) join to form a stainless steel blowdown header. Four individual blowdown headers are routed from the respective steam generator to the primary auxiliary building through containment isolation valves.

Downstream of the containment isolation valves, blowdown flow can be diverted to either the blowdown flash tank or the blowdown recovery system. During normal operation, blowdown is routed to the recovery system. The steam generator blowdown recovery system consists of two heat exchangers, a filter and demineralizer package, and associated piping, valves and instrumentation.

The SGBD system includes the major components of the steam generator blowdown system and the steam generator blowdown recovery system. However, piping, valves, and instrumentation associated with steam generator blowdown recovery are components in the steam generator blowdown recovery system, SGBDR, described below.

The SGBD system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.
- Isolate blowdown upon a loss of feedwater to prevent loss of secondary inventory.

The SGBD system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The SGBD system has the following intended function for 10 CFR 54.4(a)(3).

- Isolate the blowdown during the shutdown/cooldown when AFW is actuated for fire (10 CFR 50.48), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

*Steam Generator Blowdown Recovery*

The SGBDR system includes piping, valves and instrumentation of the steam generator blowdown recovery system.

The SGBDR system has no intended functions for 10 CFR 54.4(a)(1).

The SGBDR system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The SGBDR system has no intended functions for 10 CFR 54.4(a)(3).

*Steam Generator Sampling*

The purpose of the steam generator sampling (SGS) system is to provide representative samples of the secondary side water for laboratory analysis. Analyses show both chemical and radiochemical conditions. The system provides sample capability for each steam generator from its blowdown line inside containment. Separate containment penetrations are provided for each sample line routed to the sample room, where the liquid is cooled and the pressure reduced. Each individual sample is then split into two routes: one goes to the sample sink to provide periodic samples for chemical analysis, the second goes to a conductivity cell, a radiation monitor, and then to the blowdown flash tank. This second line handles a continuous flow for a constant reading of conductivity and a constant monitoring for radiation.

The SGS system has the following intended function for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.
- Maintain the component cooling water system pressure boundary in the steam generator sample heat exchangers (sample cooling and heat transfer are not required, but the heat exchangers are required to maintain the cooling water system pressure boundary).

The SGS system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The SGS system has no intended functions for 10 CFR 54.4(a)(3).

UFSAR References

Unit 2: Section 10.2.1.5

Unit 3: SGBD and SGBDR, Section 10.2.1; SGS, Section 9.4.1

Components Subject to Aging Management Review

*Unit 2*

A small number of SGBD components are evaluated with the service water systems (Section 2.3.3.2). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining components are reviewed as listed below.

*Unit 3*

A small number of SGBD components are evaluated with the service water systems (Section 2.3.3.2). The steam generator sample heat exchangers (SGS system) are safety-related only for their cooling water pressure boundary function (heat transfer is not a required function) and these heat exchangers are therefore evaluated with the component cooling water system (Section 2.3.3.3). Nonsafety-related components (SGBD, SGBDR, and SGS systems) not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19). Remaining SGS and SGBD components are reviewed as listed below.

Table 2.3.4-4-IP2 and Table 2.3.4-4-IP3 list the component types that require aging management review.

Table 3.4.2-4-IP2 and Table 3.4.2-4-IP3 provide the results of the aging management review.

License Renewal Drawings

Additional details for components subject to aging management review are provided in the following license renewal drawings.

| *Unit 2* | *Unit 3* |
|---|---|
| LRA-9321-2729 | LRA-9321-27293, sheet 1 |
|  | LRA-9321-27293, sheet 2 |

### 2.3.4.5 IP2 AFW Pump Room Fire Event

System Description

This evaluation is for systems that in combination provide and support main feedwater flow to the steam generators during a shutdown (Unit 2 only). This combination of systems is credited as a method of supplying make-up water to the steam generators during a fire in the auxiliary boiler feed pump room for an assumed duration of at least one hour. This method was necessary because the current design and licensing basis requires the assumption that plant personnel are unable to re-enter the fire area for at least one hour following onset of the fire.

Unit 2 UFSAR Section 9.6.2 describes the fire protection system requirements and regulations. A combination of secondary systems and components provide a method of feeding the steam generators should a fire in the AFW pump room make it temporarily unavailable for operator actions. These plant systems and components provide feedwater flow through the main feedwater isolation valves to the steam generators from the IP1 condensate storage tanks (CST). The flow path is from the Unit 1 CSTs through the hotwell dump and condensate transfer pump, through the condensate pumps and boiler feed pumps to the main feedwater isolation valves to the steam generators.

The following systems support this flow path. If the system is described elsewhere, the section reference is given.

- auxiliary steam
- conventional closed cooling
- condensate (Section 2.3.4.6)
- circulating water
- city water (Section 2.3.3.17)
- feedwater (Section 2.3.4.2)
- fresh water cooling (Unit 1 system)
- instrument air (Section 2.3.3.4)
- instrument air closed cooling
- lube oil
- main steam (Section 2.3.4.1)
- river water service (Unit 1 system)
- service water (Section 2.3.3.2)
- station air (Section 2.3.3.4) (Unit 1 system)
- water treatment plant (Unit 1 system)
- wash water

These systems are normally in service and will be available prior to a fire in the auxiliary boiler feed pump room.

Each system listed above has the following intended function for 10 CFR 54.4(a)(3).

- Support safe shutdown in the event of a fire in the auxiliary feed pump room (10 CFR 50.48).

Systems described elsewhere in the application have additional intended functions not related to the AFW pump room fire event. See the referenced section.

Systems not described elsewhere in the application are described below. These systems have additional intended functions not related to the AFW pump room fire event. These additional intended functions are listed with individual system descriptions.

### *Auxiliary Steam*

The purpose of the auxiliary steam (AS) system is to provide auxiliary steam to unit heaters for room and area heating and to various plant components. Heating is provided to many areas, including the containment and the control room, and to some components like the RWST heating coil. The system includes components from Unit 1 and Unit 2. The heating function is not a safety function; however, the system includes several containment penetrations with safety-related components, and the RWST heating coil has a pressure boundary safety function.

For the AFW pump room fire event, auxiliary steam supports the condenser water box priming steam jet air ejectors and oil preheat in the lube oil system.

The AS system also has the following intended functions for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.
- Provide pressure boundary function for the interface between the auxiliary steam system and the water in the refueling water storage tank.

The AS system also has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

### *Conventional Closed Cooling*

The purpose of the CCC system is to provide cooling water to various components, including condensate and heater drain pumps, main boiler feed pump pedestals, and station air compressors. The CCC system includes circulating pumps, heat exchangers (cooled by service water), head tank, distribution piping valves, instruments and controls. Cooling water from the CCC system is not required to support any system safety function.

The CCC system also has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

*Circulating Water*

The purpose of the circulating water (CW) system is to provide cooling water to the condenser to condense the steam exiting the low pressure turbines and main boiler feed pump turbines. Hudson River water is used as the supply of the condenser circulating water. The six condenser circulating water pumps are located in the intake structure. The circulating water is piped to the condensers and is discharged back via the discharge canal into the river. The system includes the circulating water pumps, condenser inlet and outlet water boxes, piping, valves, instruments and controls.

The CW system also has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

*Fresh Water Cooling*

The purpose of the fresh water cooling (FWC) system is to provide cooling to miscellaneous, nonsafety-related heat loads, including Unit 1 air compressors and house service boiler components. The system includes the fresh water cooling recirculating tank, fresh water circulating pumps, heat exchangers cooled by river water, and distribution piping and valves. There are no safety-related components in this system.

The FWC system also has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

*Instrument Air Closed Cooling*

The purpose of the instrument air closed cooling (IACC) system is to provide a heat removal medium for the instrument air compressors and aftercoolers. The system consists of a separate closed loop cooling water system of two small pumps, valves, piping, and heat exchangers that supplies cooling water to the instrument air compressors and aftercoolers and rejects that heat to the service water system.

The IACC system also has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

### *Lube Oil*

The purpose of the lube oil (LO) system is to maintain and provide a supply of oil for lubrication and control of the main turbine and the main boiler feedwater pumps and turbines. The system includes the main lubricating/control oil reservoirs, pumps, coolers, piping, valves and indications. The system also includes components of the main turbine controls.

Two turbine control components are credited for turbine trip for Appendix R safe shutdown. The auto stop trip solenoid has only an active function for turbine trip. The auto stop oil turbine trip solenoid releases oil pressure to trip and does not need to maintain a pressure boundary. Neither of these components have a passive mechanical intended function.

The LO system also has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

### *River Water Service*

The purpose of the river water service (RW) system is to provide cooling water from the Hudson River to the fresh water cooling system heat exchangers. This system consists primarily of Unit 1 equipment used to support Unit 2. The system provides backup to the service water system by supplying non-essential loads. This system includes four Class A pipe segments that support the service water system. These pipe segments are part of the service water supply and return from an instrument air cooling water heat exchanger.

The RW system also has the following intended function for 10 CFR 54.4(a)(1).

- Support service water system pressure boundary.

The RW system also has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

### *Water Treatment Plant*

The purpose of the water treatment plant (WTP) system is to provide demineralized water for various uses throughout the Indian Point site. The water treatment plant consists primarily of Unit 1 equipment located in the superheater building. The facility takes city water through a demineralization system to provide water to all three units. The system includes demineralization and deaeration equipment, distribution piping, valves instruments and controls. The system also includes the Unit 1 condensate storage tanks.

For the AFW pump room fire event, the source of water for make-up to the steam generators is the IP1 condensate storage tanks. The make-up path is from the IP1 condensate storage tanks to the IP2 hotwell dump and condensate transfer pump.

The WTP system also has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

### *Wash Water*

The purpose of the wash water (WW) system is to wash fish and debris from the traveling screens. Fish and debris are washed from the screens and returned to the river. The WW system includes the pumps, piping, strainers, valves instruments and controls for the screen wash function. Wash water components are not required to support the operation of the service water system.

### UFSAR References

Auxiliary steam system, Unit 2 UFSAR Section 9.6.5

Circulating water system, Unit 2 UFSAR Section 10.2.4

River water service, Unit 1 UFSAR Section 3.7.4

Water treatment plant, Unit 1 UFSAR Section 3.7.2

Other systems have no UFSAR descriptions.

Components Subject to Aging Management Review

Auxiliary steam system components supporting the RWST pressure boundary are evaluated with the safety injection systems (Section 2.3.2.4). River water system components forming part of the service water system pressure boundary are evaluated with service water systems (Section 2.3.3.2). Containment penetrations are reviewed in Section 2.3.2.5. Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19).

For license renewal, the primary intended function of components associated with the AFW pump room fire event is to maintain system pressure boundary integrity. The heat exchangers have the function of heat transfer. The filters have the function of filtration.

Aging management of the systems required to supply feedwater to the steam generators during a fire in the AFW pump room is not based on an analysis of materials, environments and aging effects. The components in the systems required to supply feedwater to the steam generators during the short duration of the fire event are in service at the time the event occurs or their availability is checked daily. Required components are adequately separated from the AFW pump room. Therefore, integrity of the systems and components required to perform post-fire intended functions for at least one hour is continuously confirmed by normal plant operation.

During the event these systems and components must continue to perform their intended functions to supply feedwater to the steam generators for a minimum of one hour. Significant degradation that could threaten the performance of the intended functions will be apparent in the period immediately preceding the event and corrective action will be required to sustain continued operation. For the minimal one-hour period that these systems would be required to provide make-up to the steam generators, further aging degradation that would not have been apparent prior to the event is negligible. Therefore, no aging effects are identified.

The IP1 condensate storage tanks are only subject to intermittent service. Therefore, a daily check of tank level and intermittent usage of piping and valves from the IP1 CSTs to the IP2 condenser confirm availability. Significant degradation that could threaten the performance of the intended functions will be apparent in the period immediately preceding the event and corrective action will be required to sustain continued operation.

Since normal plant operation assures adequate pressure boundary integrity, the post-fire intended function to provide feedwater to the steam generators is assured. Therefore, no specific aging management program is required.

License Renewal Drawings

No LRA drawings are provided based on the intended function of supporting safe shutdown in the event of a fire in the auxiliary feed pump room. For those components evaluated with other systems, see the referenced sections for drawing information.

### 2.3.4.6 Condensate

*Unit 2*

The purpose of the condensate (COND) system is to transfer condensate and low pressure heater drains from the condenser hotwell through five stages of feedwater heating to the main feedwater pumps. Three condensate pumps, arranged in parallel, take suction from the bottom of the condenser hotwells. The pumps discharge into a common header that carries a portion of the condensate through three steam jet air ejector condensers, arranged in parallel, and through one gland steam condenser. The condensate passes through the tube sides of three parallel strings of two low-pressure feedwater heaters. The flow from these heaters is combined in a common line, and then divided to go to the remaining three strings of three low-pressure heaters. After the No.5 feedwater heater, the three condensate lines join into a common header. The heater drain pump discharge enters this header and then continues on to the suction of the main feedwater pumps.

The COND system includes most condensate system components from the condenser to the outlet of the main boiler feedwater pumps. The system includes the main condensers, the condensate and main boiler feedwater pumps, low pressure feedwater heaters, piping, valves, and instruments and controls.

The majority of the system is not safety-related; however, the air ejector discharge to containment penetration is included in this system code. Some system components support the pressure boundary of the AFW system flowpath from the condensate storage tank to the auxiliary feedwater pumps.

The COND system has the following intended function for 10 CFR 54.4(a)(1).

- Provide containment isolation capability for lines penetrating containment.
- Support the AFW system flowpath from the condensate storage tank to the auxiliary feedwater pumps.

The COND system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The COND system has the following intended function for 10 CFR 54.4(a)(3).

- Support safe shutdown in the event of a fire in the auxiliary feed pump room (10 CFR 50.48) (see Section 2.3.4.5).

*Unit 3*

The condensate system is comprised of components in several system codes, including COND, CP, CPA, CPD, CPS, and CXFR. System code CPA (condensate polisher air) is not within the scope of license renewal as components in this system are not required to support a system intended function. Remaining system codes are addressed below.

Following is a general description of the entire condensate system.

The purpose of the condensate system is to transfer condensate and low pressure heater drains from the condenser hotwell through the condensate polisher and five stages of feedwater heating to the suctions of the main feedwater pumps. The condensate system also provides the primary source of water to the auxiliary feedwater pumps.

As part of the main condensate flowpath, three condensate pumps, arranged in parallel, take suction from the bottom of the condenser hotwells and discharge into a common header to the condensate polisher system. From the polisher system, a portion of the condensate passes through three steam jet air ejector condensers, arranged in parallel, and through one gland steam condenser. The condensate passes through the tube sides of three parallel strings of two low-pressure feedwater heaters. The flow from these heaters is combined in a common line, then divided to go to the remaining three strings of three low-pressure heaters. After the No.5 feedwater heater, the three condensate lines join into a common header. The heater drain pump discharge enters this header and then continues on to the suction of the main feedwater pumps.

*COND*

The COND system code is a general code that includes miscellaneous condensate system components, mostly valves, including a large number of small valves supplying condensate as gland seal water to various secondary plant valves. Within the code, one valve has a safety function as part of the pressure boundary for the flowpath from the condensate storage tank to the auxiliary feedwater pumps.

The COND system has the following intended functions for 10 CFR 54.4(a)(1).

- Support the flowpath from the condensate storage tank to the auxiliary feedwater pumps.

The COND system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The COND system has no intended functions for 10 CFR 54.4(a)(3).

*CP*

The purpose of the condensate polishing (CP) system is to remove dissolved and suspended solids from the condensate in order to maintain the feedwater quality required for the steam generators. The polishers are installed within the existing condensate system between the condensate pumps and the first stage of feedwater heaters. The CP system consists of six service vessels, six condensate post filters, three condensate booster pumps, and piping, valves, instrumentation and controls.

The CP system has no intended functions for 10 CFR 54.4(a)(1) or (a)(3).

The CP system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

*CPD*

The purpose of the condensate pump discharge (CPD) system is to support sampling of the condensate pump discharge. The components in this system code include the small sampling piping and valves at the discharge of the condensate pumps.

The CPD system has no intended functions for 10 CFR 54.4(a)(1) or (a)(3).

The CPD system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

*CPS*

The purpose of the condensate pump suction (CPS) system is to supply water to the condensate pumps from the main condenser. The components in this system code include the expansion joints, piping and valves between the condenser and the condensate pumps.

The CPS system has no intended functions for 10 CFR 54.4(a)(1) or (a)(3).

The CPS system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

*CXFR*

The purpose of the condensate transfer (CXFR) system is to provide the means to transfer condensate from the condenser to the suction of the main boiler feedwater pumps and from the condensate storage tank to the auxiliary feedwater pumps. With the exception of the condensate polishers and their support equipment, this system code includes most condensate system components from the condensate pumps to the suction of the main boiler feedwater pumps. Also included are the condensate storage tank and piping and components to the auxiliary feedwater pump suction header. The system code includes the main condensers, the condensate and low pressure feedwater heaters, piping, valves, instruments and controls, and other condensate system components.

The CXFR system has the following intended functions for 10 CFR 54.4(a)(1).

- Provide condensate to the auxiliary feedwater system from the condensate storage tank (CST).
- Provide the capability to isolate various CST incoming and outgoing lines to ensure adequate inventory.

The CXFR system has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related components such that no physical interaction with safety-related components could prevent satisfactory accomplishment of a safety function.

The CXFR system has the following intended functions for 10 CFR 54.4(a)(3).

- Provide capability to prevent CST draindown following an Appendix R event.
- Provide water to the auxiliary boiler feedwater pumps during a station blackout.

UFSAR References

Unit 2: Section 10.2.6

Unit 3: Section 10.2.6

Components Subject to Aging Management Review

*Unit 2*

COND system components that support safe shutdown in the event of a fire in the auxiliary feed pump room are evaluated in Section 2.3.4.5. Components that support the pressure boundary of the AFW system flowpath are evaluated with the auxiliary feedwater systems (Section 2.3.4.3). Containment penetration components are evaluated with containment penetrations (Section

2.3.2.5). Nonsafety-related components not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19).

*Unit 3*

The COND component forming part of the auxiliary feedwater pump suction flowpath is evaluated with the auxiliary feedwater systems (Section 2.3.4.3). The condensate storage tank portions of the CXFR system code support AFW system functions and are evaluated with the auxiliary feedwater systems (Section 2.3.4.3). Nonsafety-related components (COND, CP, CPD, CPS, and CXFR systems) not evaluated with other systems whose failure could prevent satisfactory accomplishment of safety functions are evaluated with miscellaneous systems in scope for (a)(2) (Section 2.3.3.19).

Because condensate system components are evaluated with other systems, including miscellaneous systems in scope for (a)(2), there are no tables associated with this section.

### Table 2.3.4-1-IP2
### Main Steam System
### Components Subject to Aging Management Review

| **Component Type** | **Intended Function(s)** |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Pressure boundary |
| Piping | Pressure boundary |
| Silencer | Pressure boundary |
| Steam trap | Pressure boundary |
| Strainer | Filtration |
| Strainer housing | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.4-1-IP3
### Main Steam System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flow element | Pressure boundary |
| Piping | Pressure boundary |
| Silencer | Pressure boundary |
| Steam trap | Pressure boundary |
| Strainer | Filtration |
| Strainer housing | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.4-2-IP2
## Main Feedwater System
## Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.4-2-IP3
## Main Feedwater System
## Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## Table 2.3.4-3-IP2
## Auxiliary Feedwater System
## Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flex hose | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Orifice | Flow control<br>Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Steam trap | Pressure boundary |
| Strainer | Filtration |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Turbine housing | Pressure boundary |
| Valve body | Flow control<br>Pressure boundary |

## Table 2.3.4-3-IP3
## Auxiliary Feedwater System
## Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Flex hose | Pressure boundary |
| Flow element | Pressure boundary |
| Heat exchanger (shell) | Pressure boundary |
| Heat exchanger (tubes) | Heat transfer<br>Pressure boundary |
| Orifice | Flow control<br>Pressure boundary |
| Piping | Pressure boundary |
| Pump casing | Pressure boundary |
| Sight glass | Pressure boundary |
| Steam trap | Pressure boundary |
| Strainer | Filtration |
| Strainer housing | Pressure boundary |
| Tank | Pressure boundary |
| Thermowell | Pressure boundary |
| Tubing | Pressure boundary |
| Turbine housing | Pressure boundary |
| Valve body | Flow control<br>Pressure boundary |

### Table 2.3.4-4-IP2
### Steam Generator Blowdown System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Valve body | Pressure boundary |

### Table 2.3.4-4-IP3
### Steam Generator Blowdown System
### Components Subject to Aging Management Review

| Component Type | Intended Function(s) |
|---|---|
| Bolting | Pressure boundary |
| Piping | Pressure boundary |
| Tubing | Pressure boundary |
| Valve body | Pressure boundary |

## 2.4 SCOPING AND SCREENING RESULTS: STRUCTURES

Structures and structural components within the scope of license renewal are the containment buildings (Section 2.4.1), water control structures (Section 2.4.2), turbine buildings, auxiliary buildings, and other structures (Section 2.4.3), and bulk commodities (piping and conduit supports, electrical cabinets, tank foundations, etc.) (Section 2.4.4).

### 2.4.1 Containment Buildings

Description

The following description applies to the containment buildings for Unit 2 and Unit 3. The containment buildings are also known as vapor containments.

Each containment building completely encloses the entire reactor and the reactor coolant system and ensures that essentially no leakage of radioactive materials to the environment would result even if a design basis loss-of-coolant accident were to occur. The reactor containment structure is a seismic Class I, reinforced concrete vertical right cylinder with a flat base and hemispherical dome. A welded steel liner is attached to the inside face of the concrete shell to ensure a high degree of leaktightness. The liner includes accommodations for penetrations and personnel access. Covering the steel liner plate is an insulating material of urethane foam covered with gypsum board and a stainless steel jacket and backed with a fire retardant paper on the unexposed side. The containment liner is anchored to the concrete shell by means of stud anchors. The base mat is reinforced concrete with the bottom liner plate located on top of this mat. This bottom liner plate is covered with additional concrete, the top of which forms the floor of the containment. Internal structures consist of equipment supports, shielding, reactor cavity and canal for fuel transfer, manipulator crane, containment crane, and miscellaneous concrete and steel for floors and stairs. All internal structures are supported on the mat with the exception of equipment supports secured to the intermediate floors.

The containment buildings have the following intended functions for 10 CFR 54.4(a)(1), (a)(2) and (a)(3).

- Provide support, shelter and protection for safety-related equipment.
- Maintain integrity such that safety-related equipment is not affected. This function is also performed by nonsafety-related refueling equipment and cranes.
- Provide protection as credited in the Appendix R safe shutdown capability analysis (10 CFR 50.48).
- Maintain essential leaktight barrier.

UFSAR References

Unit 2: Sections 1.2.2, 1.11.2, 5.2.1

Unit 3: Sections 1.3.5, 5.2.1, 16.1.2

Components Subject to Aging Management Review

Structural commodities are structural members that support or protect plant equipment including system components, piping, and electrical raceways. Structural commodities that are unique to the reactor building and primary containment are included in this review. Those that are common to IPEC in-scope systems and structures (i.e., anchors, embedments, equipment supports, instrument panels, racks, cable trays, and conduits) are reviewed with the bulk commodities (Section 2.4.4).

Table 2.4-1 lists the component types that require aging management review.

Table 3.5.2-1 provides the results of the aging management review.

### 2.4.2 Water Control Structures

Description

The following structures are included in this evaluation.

- discharge canal and outfall structure
- intake structure (also known as screenwell structure) and intake structure enclosure building
- service water pipe chase
- service water valve pit

*Discharge Canal and Outfall Structure*

The discharge canal and outfall structure, located west of the Unit 2 and Unit 3 turbine buildings, extends from the Unit 1 turbine building and carries the service water system discharge to the river. Three Unit 3 backup service water pumps, which provide cooling water from the discharge canal in the unlikely event that the service water intake structure is damaged, are supported on a slab spanning the walls of the canal. The service water pipe chase, a concrete structure enclosing the service water line, spans across the discharge canal. The portion of the discharge canal wall that is adjacent to the service water pipe chase is seismic Class I and is part of the ultimate heat sink. The outfall structure is provided to enhance mixing of cooling water and river water in such a way as to minimize thermal impact in the river. The discharge port gates can be adjusted mechanically to control the discharge velocity of the fluid.

The discharge canal and outfall structure are seismic Class III. The canal portion consists of reinforced concrete walls and foundation. The outfall structure is steel sheet piling driven into the bedrock and consists of 12 submerged rectangular ports equipped with adjustable gates that are in line and parallel to the river axis. The ports, 4 feet high by 15 feet wide and spaced 21 feet apart (center to center), are submerged to a depth of 12 feet. The slab foundation for the backup service water pumps is a reinforced concrete slab supported by the concrete walls of the canal. The discharge canal contains no safety-related equipment and service water flow is not dependent on the discharge canal. The outfall structure does not support a license renewal function as defined by 10CFR54.4 and therefore is not in scope.

The discharge canal has the following intended functions for 10 CFR 54.4(a)(1), (a)(2) and (a)(3).

- Maintain ultimate heat sink.
- Provide structural support of nonsafety-related components such that safety functions are not affected.

*Intake Structure*

The Unit 1 intake structure (also known as the screenwell house) is a seismic Class III structure located adjacent to the wharf and west of the station on the riverbank. It houses electrical components required for the alternate safe shutdown system, which is credited in the Appendix R safe shutdown analysis. The lower portion contains the Unit 1 intake, which houses the river water pumps that support Unit 2 service water.

The structure is a reinforced concrete frame supported by a massive concrete substructure. Exterior walls of the intake structure are of concrete brick construction. The north and south ends of the structure are covered by a reinforced concrete roof slab.

The Unit 1 intake structure has no intended functions for 10 CFR 54.4(a)(1) or (a)(2).

The Unit 1 intake structure has the following intended function for 10 CFR 54.4(a)(3).

- Provide support, shelter and protection for equipment credited for regulations associated with fire protection (10 CFR 50.48).

The Unit 2 intake structure (also known as the screenwell structure) is located west of the site and is built below grade at the Hudson River bank. The structure is open to the river on the west side. The Unit 3 intake structure (also known as the screenwell structure) is located west of the containment structure. Each structure houses six circulating water pumps (each contained in a separate reinforced concrete compartment), six service water pumps (a service water bay enclosure protects the Unit 3 pumps), traveling and fixed screens, and screen wash equipment. A service water strainer pit is located on the east side of each structure. The pit houses service water strainers, screen wash piping, and the strainer control panel. Both the service water strainer pit and the service water bay enclosure are seismic Class I.

For both Unit 2 and Unit 3, the intake structure is a massive reinforced concrete structure, consisting of separate concrete cells. The base of the structure is founded on rock and the exterior walls of the structure are reinforced concrete. The service water strainer pit is a reinforced concrete structure with the west wall being common to the intake structure. The pit is covered with steel decking supported on I-beams. The service water bay enclosure consists of structural steel framing and grating.

The Unit 2 and Unit 3 intake structures have the following intended functions for 10 CFR 54.4(a)(1), (a)(2) and (a)(3).

- Provide support, shelter and protection for safety-related equipment (service water pumps).
- Maintain integrity such that the seismic Class I portion and the service water pumps are not affected.
- Maintain ultimate heat sink.

- Provide support, shelter and protection for equipment credited in the Appendix R safe shutdown capability analysis.

*Intake Structure Enclosure Building*

The intake structure enclosure building (also known as the screenwell structure) is located west of the containment structure and provides an upper separate enclosure structure for the Unit 3 intake structure. It provides environmental protection of circulating water and service water system components from the weather. Dampers located in the roof system provides for release of excess heat during normal operations. The intake structure enclosure consists of a single story steel-framed super-structure with exterior metal siding and ventilation panels.

The intake structure enclosure building has the following intended function for 10 CFR 54.4(a)(1).

- Maintain integrity such that the seismic Class I portion and the service water pumps are not affected.

The intake structure enclosure building has no intended function for 10 CFR 54.4(a)(2) or (a)(3).

*Service Water Pipe Chase*

The Unit 3 service water pipe chase provides protection of service water lines that span across the discharge canal. The structure provides protection of the service water valves and associated piping. The service water pipe chase is a reinforced concrete structure integrally attached to the discharge canal wall. The portion of the discharge canal wall that is adjacent to the service water pipe chase is seismic Class I.

This structure has the following intended functions for 10 CFR 54.4 (a)(1) and (a)(2).

- Maintain structural integrity such that service water intended function is not impacted.

This structure has no intended functions for 10 CFR 54.4(a)(3).

*Service Water Valve Pit*

A service water valve pit is provided for protection of service water components in the Unit 2 and Unit 3 intake structures. The pits are located at the west side of Unit 2 and 3 heater bay building. Unit 3 has an additional service water valve pit located on the north end of the Unit 3 heater bay building, which serves the back-up service water pumps. The service water valve pits are underground reinforced concrete structures covered by structural steel plate welded to I-beams at ground level. The additional service water valve pit for Unit 3 has a precast concrete roof.

This structure has the following intended functions for 10 CFR 54.4 (a)(1) and (a)(2).

- Maintain structural integrity such that service water intended function is not impacted.

This structure has no intended functions for 10 CFR 54.4(a)(3).

UFSAR References

Unit 2: Section 8.3 discusses alternate shutdown requirement (Unit 1 intake structure).

Components Subject to Aging Management Review

Structural commodities are structural members that support or protect plant equipment including system components, piping, and electrical raceways. Structural commodities that are unique to the water control structures are included in this review. Those that are common to IPEC in-scope systems and structures (i.e., anchors, embedments, equipment supports, instrument panels, racks, cable trays, and conduits) are reviewed with the bulk commodities (Section 2.4.4).

Table 2.4-2 lists the component types that require aging management review.

Table 3.5.2-2 provides the results of the aging management review.

## 2.4.3 Turbine Buildings, Auxiliary Buildings, and Other Structures

### Description

The following structures are included in this evaluation.

- Appendix R Diesel Generator Foundation, Fuel Oil Tank Vault, Switchgear and Enclosure (IP3)
- Auxiliary Feedwater Pump Building (IP2/3)
- Boric Acid Evaporator Building (IP2)
- City Water Storage Tank Foundation and Meter House
- Condensate Storage Tanks Foundation (IP2/3)
- Containment Access Facility and Annex (IP3)
- Control Buildings (IP2/3)
- Diesel Generator Buildings (IP2/3)
- Electrical Tunnels (IP2/3)
- Emergency Lighting Poles and Foundations
- Fan Houses (IP2/3)
- Fire Pump House (IP2)/Fire Protection Pump House (IP3)
- Fire Water Storage Tank Foundation (IP2/3)
- Fuel Storage Buildings (IP2/3)
- Gas Turbine Generator No. 1, 2 and 3 Enclosure and Fuel Tank Foundation
- Maintenance and Outage Building Elevated Passageway (IP2)
- Manholes and Duct Banks
- New Station Security Building
- Nuclear Service Building (IP1)
- Power Conversion Equipment Building (IP3)
- Primary Auxiliary Buildings (IP2/3)
- Primary Water Storage Tanks Foundation (IP2/3)
- Radiation Monitoring Enclosure (IP2)
- Refueling Water Storage Tanks Foundation (IP2/3)
- Security Access and Office Building (IP3)
- Superheater Building (IP1)
- Superheater Stack (IP1)
- Transformer/Switchyard Support Structures
- Transmission Towers (SBO Recovery Path) and Foundations
- Turbine Building (IP1/2/3) and Heater Bay (IP2/3)
- Utility Tunnel
- Waste Holdup Tank Pit (IP2/3)

*Appendix R Diesel Generator Foundation, Fuel Oil Tank Vault, Switchgear and Enclosure (IP3)*

The Appendix R diesel generator, fuel oil tank vault and switchgear are located in separate but adjacent enclosures in the yard area, north of the auxiliary feedwater pump room. The purpose of the Appendix R diesel generator, fuel oil tank vault and switchgear is to support a sufficient power supply to allow the plant to be brought to cold shutdown in the event that there is a loss of off-site power coincident with a fire resulting in the loss of all three emergency diesel generators or their distribution systems.

The Appendix R diesel generator is supported on a reinforced concrete foundation and enclosed by a pre-fabricated metal structure. The fuel oil tank vault is a below-grade reinforced concrete structure supported on bedrock. The switchgear and its associated equipment is supported on a reinforced concrete foundation and enclosed in a separate pre-fabricated metal structure.

These structures have no intended functions for 10 CFR 54.4 (a)(1) or (a)(2).

These structures have the following intended function for 10 CFR 54.4(a)(3).

- Provide support, shelter and protection for components credited in the Appendix R safe shutdown capability analysis (10 CFR 50.48).

*Auxiliary Feedwater Pump Building (IP2/3)*

The Unit 2 auxiliary feedwater pump building (also known as auxiliary boiler feed pump building or auxiliary feed pump building) is located in the shield wall area between the shield wall and the Unit 2 containment building. It is a seismic Class I structure that provides protection for the Class I auxiliary feedwater pumps. The main steam lines are also located in this building and supported by the structural steel framing.

The Unit 2 auxiliary feedwater pump building is a multi-story reinforced concrete structure with a structural steel framed enclosure. A reinforced concrete shield wall is provided on one side in support of concrete floors and steel members. The structure also contains an additional concrete shield wall for protection of safety related equipment in the area.

The Unit 3 auxiliary feedwater pump building is located in the shield wall area between the shield wall and the Unit 3 Containment Building. It also includes the shield wall area enclosure. It is a seismic Class I structure that provides protection for the Class I auxiliary feedwater pumps and main steam lines located in this area.

The Unit 3 auxiliary feedwater pump building is a reinforced concrete and steel structure. The shield wall is a free-standing concrete wall with a structural steel framed enclosure. The concrete shield wall provides support for concrete floors and steel members interfacing this area.

Both structures have the following intended functions for 10 CFR 54.4(a)(1), (a)(2), or (a)(3).

- Provide support, shelter and protection for safety-related equipment.
- Maintain integrity such that safety-related equipment is not affected. The shield walls in this structure perform this function.
- Provide protection as credited in the Appendix R safe shutdown capability analysis (10 CFR 50.48) and SBO functions (10 CFR 50.63).

*Boric Acid Evaporator Building (IP2)*

The boric acid evaporator building is a seismic Class I reinforced concrete structure that is supported by the roof slab of the Unit 2 waste hold-up tank pit. The exterior walls are of concrete and concrete block construction. Portions of the concrete walls are removable. The roof over the concrete block portion is constructed of light-weight roofing over metal decking and over the concrete walls is a concrete slab.

There is no safe shutdown equipment in the boric acid evaporator building.

This structure has no intended functions for 10 CFR 54.4(a)(1) or (a)(3).

The structure has the following intended function for 10 CFR 54.4 (a)(2).

- Maintain structural integrity of nonsafety-related components such that intended functions of the waste hold-up tank pit are not affected.

*City Water Storage Tank Foundation and Meter House*

The city water storage tank and meter house provides a source of water for the auxiliary feedwater system for both Unit 2 and Unit 3 and supplies emergency water for safety injection, residual heat removal, and charging pumps. The purpose of the city water storage tank foundation is to support the safety function of the storage tank. The purpose of the meter house is to provide shelter and protection of the storage tank components. The city water storage tank is a freestanding, 1,500,000-gallon vertical-cylindrical carbon steel tank supported by a reinforced concrete spread footing foundation on rock. The meter house is a single-story concrete brick and steel structure with a concrete roof slab.

The city water storage tank foundation and meter house has no intended functions for 10 CFR 54.4(a)(1).

The city water storage tank foundation and meter house has the following intended function for 10 CFR 54.4(a)(2) and (a)(3).

- Provide support for the city water storage tank and associated components credited in the Appendix R safe shutdown capability analysis (10 CFR 50.48).

- Maintain integrity of nonsafety-related components such that safety functions supported by the city water tank are not affected.

*Condensate Storage Tanks Foundation (IP2/3)*

Two separate condensate storage tanks foundations support the condensate storage tanks for Unit 2 and 3. These tanks are supported on a reinforced concrete slab foundation.

The foundations have the following intended functions for 10 CFR 54.4(a)(1), (a)(2) and (a)(3).

- Provide support and protection for safety-related equipment and nonsafety-related equipment within the scope of license renewal. The condensate storage tanks foundations support equipment (condensate storage tanks) credited in the Appendix R safe shutdown analysis (10 CFR 50.48) and for station blackout (10 CFR 50.63).
- Maintain integrity of nonsafety-related structural components such that safety functions are not affected.

*Containment Access Facility and Annex (IP3)*

The containment access facility and annex is located adjacent to the primary auxiliary building (PAB). It is used as a handling area for contaminated material and personnel access to containment. The containment access facility and annex is Class III except for the structural steel portion interfacing with the PAB, which is seismic Class I. The containment access facility and annex consists of structural steel framing with insulated metal siding. This framing is supported on the roof floor slab of the PAB.

This structure has no intended functions for 10 CFR 54.4(a)(1) or (a)(3).

This structure has the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity of nonsafety-related structural components such that safety functions are not affected. This is performed by the seismic Class I portion of the structure at the PAB interface.

*Control Buildings (IP2/3)*

The control buildings house the central control room, cable spreading room, and other safety-related equipment and components. The IP2 control building is adjacent to the IP2 turbine building on the west and the superheater building on the south.

The IP2 control building contains both the Unit 1 and Unit 2 control rooms. It is a multi-story Class I steel framed structure with the north and east exterior wall consisting of insulated metal-sandwich panels. Floor slabs are composite type construction, concrete over steel beam.

The IP3 control building is a multi-story Class I concrete structure with concrete and concrete brick exterior. It is adjacent to the Unit 3 turbine building on one end and the diesel generator building on the south. Both structures are founded on bedrock.

Both control buildings have the following intended functions for 10 CFR54.4 (a)(1), (a)(2) and (a)(3).

- Provide functional support as a habitable environment for the operators in the control room post-accident.
- Provide shelter and protection for safety-related equipment.
- Provide support, shelter and protection for control room building components credited in the Appendix R safe shutdown capability analysis (10 CFR 50.48) and SBO functions (10 CFR 50.63).

*Diesel Generator Buildings (IP2/3)*

The Unit 2 diesel generator building is seismic Class I consisting of a reinforced concrete foundation on bedrock and a prefabricated rigid steel superstructure with insulated metal siding on the exterior with a solid, corrugated metal roof. The diesel generators rest on reinforced concrete foundations supported by the structure's main slab. A concrete shield wall is located on the west side to serve as missile protection between the control panel and diesels.

The Unit 3 diesel generator building is a single-story reinforced concrete structure on a concrete slab supported on bedrock.

Each diesel generator building houses three safety-related diesel generators. Each diesel is supplied with separate underground storage vaults, integral to the building, for fuel oil tanks. Foundations for the fuel oil tanks are the same as the structure foundation.

The diesel generator buildings have the following intended functions for 10 CFR 54.4(a)(1), (a)(2)and (a)(3).

- Provide support and protection for safety-related equipment and nonsafety-related equipment within the scope of license renewal. The diesel generator building houses equipment (emergency diesel generators) credited in the Appendix R safe shutdown analysis and for fire protection (10 CFR 50.48).
- Maintain integrity of nonsafety-related structural components such that safety functions are not affected.

*Electrical Tunnels (IP2/3)*

The electrical tunnels are partially below-grade, seismic Class I reinforced concrete structures that contain electrical cable, conduit and cable trays used in support of plant operations.

The Unit 2 electrical tunnel runs eastward from the east side of the control building. It is attached to the south side of an east-west retaining wall. The elevation of the lower slab of the tunnel slopes from the control building up to the PAB. The tunnel then turns toward northward past the west side of the PAB and to the electrical penetration area adjacent to Unit 2 containment building.

The Unit 3 electrical tunnels run from the control building past the primary auxiliary building to the containment penetration vault. The electrical tunnels consist of two seismic Class I reinforced concrete conduits located one above the other. Both the upper and lower tunnels are eight feet wide by eight feet high.

The electrical tunnels have the following intended functions for 10 CFR 54.4(a)(1), (a)(2) and (a)(3).

- Provide support and protection for safety-related equipment and nonsafety-related equipment within the scope of license renewal. The electrical bays house equipment credited in the Appendix R safe shutdown analysis, and for fire protection (10 CFR 50.48).
- Maintain integrity of nonsafety-related structural components such that safety functions are not affected.

*Emergency Lighting Poles and Foundations*

Security lighting is located around the perimeter of the plant site. This pole-mounted lighting also provides emergency lighting in the event of an Appendix R fire and a loss of offsite power by illuminating exterior access and egress.

Each emergency light pole is a single-pole steel structure supported by a reinforced concrete foundation.

The structures have no intended functions for 10 CFR 54.4(a)(1) and (a)(2).

The structures have the following intended function for 10 CFR 54.4(a)(3).

- Maintain integrity such that the components credited for Appendix R fire protection (10 CFR 50.48) are not impacted.

*Fan Houses (IP2/3)*

Each fan house is a seismic Class I structure containing the piping penetration area. Safety-related valves are located in the piping penetration area, some of which may be used to achieve safe shutdown. Each fan house building is a multi-story reinforced concrete and masonry block wall structure founded on bedrock. A steel superstructure atop each building provides support for the roof framing system.

The Unit 2 fan house is located southeast of the Unit 2 containment structure and between the Unit 2 containment, the Unit 2 primary auxiliary building, and the Unit 2 fuel storage building. The building is isolated from the containment structure and the primary auxiliary building. The east wall is common with the western wall of the fuel storage building.

The Unit 3 fan house is located southeast of the Unit 3 containment structure and between the Unit 3 containment, the Unit 3 primary auxiliary building, containment access facility, and the Unit 3 fuel storage building. The fan house building is isolated from the containment structure and the primary auxiliary building. The east wall is common with the western wall of the fuel storage building and south wall is common to the containment access facility annex.

The fan houses have the following intended function for 10 CFR 54.4(a)(1) and (a)(3).

- Maintain structural integrity such that required safety functions are not affected.

These structures have no intended functions for 10 CFR 54.4(a)(2).

### *Fire Pump House (IP2)/Fire Protection Pump House (IP3)*

The Unit 2 fire pump house (also known as diesel fire pump house) houses the main diesel firewater pump and provides protection of system components associated with the fire protection system. The structure is constructed of structural steel framing with exterior insulated metal siding and a composite metal roof. The foundation is a reinforced concrete slab on grade.

The Unit 3 fire protection pump house contains the electric-motor-driven fire pump, the diesel-driven fire pump, and associated equipment for ensuring an adequate source of firewater is available. The structure is a reinforced concrete and concrete block wall construction with a concrete roof slab. The foundation is a reinforced concrete slab on bedrock.

The structures have no intended functions for 10 CFR 54.4(a)(1) or (a)(2).

The structures have the following intended functions for 10 CFR 54.4(a)(3).

- Maintain integrity of nonsafety-related structural components credited in the Appendix R safe shutdown capability analysis (10 CFR 50.48).

### *Fire Water Storage Tank Foundation (IP2/3)*

The Unit 2 fire water storage tank (also known as suction tank) foundation provides the main support for the 300,000-gallon fire water storage tank. Water for the dedicated diesel-driven fire pump for normal operations comes from the tank.

The Unit 3 fire water storage tank foundations provide the main support for two 350,000-gallon fire water storage tanks. The tanks and their associated piping, electrical and instrumentation systems serve as the source of fire protection system water and as the supply for the Unit 3 makeup water treatment.

The fire water tank foundations are constructed of reinforced concrete.

These structures have the following intended functions for 10 CFR 54.4(a)(3).

- Maintain structural integrity of the fire water storage tanks in support of equipment credited in the Appendix R safe shutdown capability analysis (10 CFR 50.48).

These structures have no intended functions for 10 CFR 54.4(a)(1) or (a)(2).

*Fuel Storage Buildings (IP2/3)*

For Units 2 and 3, the fuel storage building is designed to handle and store both spent and new fuel and provides support for the spent fuel crane and other fuel handling equipment. Each structure is located adjacent to, but separate from, its respective containment building.

Each fuel storage building consists of structural steel framing with an exterior composed of insulated metal siding. The spent fuel pit located inside each structure is seismic Class I. The remaining portion of each building is seismic Class III. The internal structure of each is composed of a concrete spent fuel pit lined with stainless steel, concrete columns with infill masonry walls on the south and east faces, and a concrete wall on the west face. The top of the spent fuel pit wall forms the north wall of each area.

The fuel storage buildings have the following intended functions for 10 CFR 54.4(a)(1) and (a)(2).

- Maintain integrity of nonsafety-related components such that safety functions are not affected by maintaining pool water inventory (Units 2 and 3).

The fuel storage buildings have no intended functions for 10 CFR 54.4(a)(3).

*Gas Turbine Generator No. 1, 2 and 3 Enclosure and Fuel Tank Foundation*

The gas turbine generator No. 1 enclosure and tank foundation are seismic Class III structures providing shelter and protection from the elements for gas turbine No. 1 and its associated equipment. Gas turbine No. 1 is located adjacent to the Unit 1 turbine building and supports no license renewal function; however, the associated switchgear components and fuel supply tank provide support for the SBO/Appendix R diesel generator set.

The gas turbine No. 1 enclosure consists of structural steel framing with exterior metal siding on a reinforced concrete slab. The fuel tank foundation is a reinforced concrete spread footing which supports the fuel tank supplying the SBO/Appendix R diesel.

Gas turbine generator No. 1 enclosure and tank foundation have no intended functions for 10 CFR 54.4(a)(1) or (a)(2).

Gas turbine generator No. 1 enclosure and tank foundation have the following intended function for 10 CFR 54.4(a)(3).

- Provide support, shelter and protection for equipment credited for station blackout (10 CFR 50.63) and Appendix R safe shutdown analysis (10 CFR 50.48).

The gas turbine generators No. 2 and 3 enclosure is a seismic Class III structure providing shelter and protection from the elements for the gas turbines and their associated equipment. The gas turbine No. 2 and 3 enclosure is located at the Buchanan substation. The enclosure houses gas turbine generators No. 2 and 3 and associated switchgear equipment. The switchgear and associated components within the structure support the site's Appendix R safe shutdown analysis. Gas turbine 2 and 3 fuel tank foundation supports the fuel tank, which provides an alternate source of fuel for the emergency diesel generators. These fuel tanks are shared by IP2 and IP3 and credited with providing minimum fuel oil inventory for the emergency diesel generators. If the EDGs require the reserves in these tanks, the contents can be transported by tanker truck.

The gas turbine enclosure consists of structural steel framing with exterior metal siding, on a reinforced concrete slab. Gas turbine 2 and 3 fuel tank foundation is a reinforced concrete spread footing.

The gas turbine 2 and 3 fuel tank foundation has the following intended functions for 10 CFR 54.4(a)(1).

- Provide support for equipment credited with a safety function.

The enclosure and foundation have no intended functions for 10 CFR 54.4(a)(2).

The gas turbine generators No. 2 and 3 enclosure has the following intended functions for 10 CFR 54.4(a)(3).

- Provide support, shelter and protection for equipment credited for station blackout (10 CFR 50.63) and Appendix R safe shutdown (10 CFR 50.48).

The gas turbine substation switchgear structures and foundation provides support equipment required to achieve and maintain hot shutdown in the event a fire prevents control from the central control room.

A reinforced concrete slab supports the gas turbine substation and switchgear support structures. Component equipment is anchored by welding or bolting to the embedments in the concrete slab.

The gas turbine substation switchgear structures and foundation have no intended functions for 10 CFR 54.4(a)(1) or (a)(2).

The gas turbine substation switchgear structures and foundation have the following intended functions for 10 CFR 54.4(a)(3).

- Provide support for equipment credited in support of Appendix R safe shutdown analysis (10 CFR 50.48) and station blackout (10 CFR 50.63).

### *Maintenance and Outage Building Elevated Passageway (IP2)*

The maintenance and outage building and elevated passageway are seismic Class II structures used by maintenance and outage personnel. The structures are located southeast of the Unit 2 containment structure and across from the PAB and adjacent to the fuel storage building. The building includes two major floors and an elevated passageway for access to the PAB. A safety-related conduit has been routed through one end of the building near the bridge connecting the maintenance and outage building to the PAB.

The maintenance and outage building is a steel-framed two-story structure with reinforced concrete walls. The first floor is partially embedded into the grade and is on a rock foundation. The bridge is made of two vertical steel trusses, top and bottom horizontal bracing members, and a reinforced concrete floor slab supported by a metal deck and steel floor beams.

These structures have no intended functions for 10 CFR 54.4(a)(1) or (a)(3).

These structures have the following intended function for 10 CFR 54.4(a)(2).

- Maintain integrity such that safety related components are not affected. This is addressed by the elevated passageway portion.

### *Manholes and Duct Banks*

Manholes and duct banks are provided throughout the IPEC yard to allow underground routing of cables and piping. These structural components are constructed of reinforced and non-reinforced concrete.

These structures have the following intended functions for 10 CFR 54.4(a)(1) and (a)(2).

- Provide support and protection for safety-related equipment and nonsafety-related equipment within the scope of license renewal.
- Maintain integrity of nonsafety-related structural components such that safety functions are not affected.

These structures have no intended functions for 10 CFR 54.4(a)(3).

*New Station Security Building*

The new station security building located east of the Unit 1 containment structure provides offices for personnel and contains the security generator, which is credited as a source of backup power to the station security lighting system. For Unit 2, this lighting provides illumination for exterior access and egress in the event of an Appendix R fire and a loss of offsite power.

The new station security building is a single-story structure consisting of structural steel framing with exterior metal siding supported by a reinforced concrete foundation.

The structure has no intended functions for 10 CFR 54.4(a)(1) and (a)(2).

The structure has the following intended function for 10 CFR 54.4(a)(3).

- Maintain integrity such that the components credited for Unit 2 Appendix R fire protection (10 CFR 50.48) are not impacted.

*Nuclear Service Building (IP1)*

The nuclear service building is adjacent to but separated from the Unit 1 containment structure and provides protection for alternate safe shutdown system (ASSS) components in support of Unit 2. These ASSS components consist of cables in conduit for various systems: chemical and volume control, component cooling water, residual heat removal, and safety injection systems. The structure contains treatment and decontamination facilities along with examination rooms for site personnel. The nuclear services building is a seismic Class III multi-story reinforced concrete structure enclosed by three exterior concrete walls supported on a reinforced concrete mats with a concrete roof. The north and south concrete walls of the structural portion below grade are poured against the existing rock.

The nuclear service building has no intended function for 10 CFR 54.4(a)(1) or (a)(2).

The nuclear service building has the following intended function for 10 CFR 54.4(a)(3).

- Maintain integrity such that the components credited in safe shutdown analysis are not affected.

*Power Conversion Equipment Building (IP3)*

The power conversion equipment building houses power conversion system components. The power conversion equipment building is a single-story steel-framed structure with a reinforced concrete floor slab and composite roofing. The exterior wall is covered with metal siding with fixed louvers on one side. Steel floor beams span across the concrete walls of the discharge canal to support the entire structure.

There is no safe shutdown equipment in the power conversion building.

This structure has no intended functions for 10 CFR 54.4(a)(1) or (a)(3).

This structure has the following intended functions for 10 CFR 54.4(a)(2).

- Maintain structural integrity of nonsafety-related structural components such that safety function of the discharge canal is not affected.

*Primary Auxiliary Buildings (IP2/3)*

The Unit 2 primary auxiliary building is a seismic Class I structure. The PAB houses safety injection pumps, component cooling pumps, heat exchangers and residual heat removal pumps. The PAB is a reinforced concrete structure with steel framing and metal siding. Interior walls may be concrete or concrete block. Concrete block walls are generally multi-wythe functioning as removable shielding and closure walls. The structure has a reinforced concrete foundation supported on existing bedrock.

The Unit 3 primary auxiliary building houses the components required for recirculation such as component cooling pumps, heat exchangers, and safety injection and residual heat removal pumps. The primary auxiliary building is a free-standing three-story rectangular reinforced concrete structure located southeast of the containment structure. The structure is provided with floor slabs and structural steel for equipment and other supports. A basement is located under the western half of the building. The first floor on the eastern end of the structure is embedded in the ground on rock with the second story being at grade. Concrete caissons support portions of the structure.

These structures have the following intended functions for 10 CFR 54.4 (a)(1), (a)(2) and (a)(3).

- Provide support, shelter and protection for safety-related equipment.
- Provide support, shelter and protection for equipment credited in the Appendix R safe shutdown capability analysis.

These structures have no intended functions for 10 CFR 54.4(a)(2).

*Primary Water Storage Tanks Foundation (IP2/3)*

The Unit 2 and Unit 3 primary water storage tank foundations provide the main support for the respective 165,000 gallon primary water storage tank for each unit. The tanks supply demineralized water for the primary water makeup systems. Primary water storage tank foundations are seismic Class I reinforced concrete spread footings supporting the primary water storage tanks.

The Unit 2 primary water storage tank foundation has the following intended functions for 10 CFR 54.4(a)(1) and (a)(2).

- Maintain structural integrity such that the primary water storage tank intended function is not impacted.
- Provide functional support for the backup source of cooling water to the CCW system for cooling of the safety injection pumps and heat removal pumps.

The Unit 2 primary water storage tank foundation has no intended functions for 10 CFR 54.4(a)(3).

The Unit 3 primary water storage tank foundation has no intended functions for 10 CFR 54.4(a)(1).

The Unit 3 primary water storage tank foundation has the following intended functions for 10 CFR 54.4(a)(2) and (a)(3).

- Maintain structural integrity such that the primary water storage tank intended function is not impacted.
- Provide support for Appendix R intended function (10 CFR 50.48).

### *Radiation Monitoring Enclosure (IP2)*

The radiation monitoring enclosure houses radiation monitors R46, R49 and R53. Monitors R46 and R53 monitor the service water return from all containment fan cooler units. The radiation monitoring enclosure is a three-sided steel-framed structure with metal siding. It shares a common reinforced concrete wall with the electrical tunnel.

This structure has no intended functions for 10 CFR 54.4(a)(1) or (a)(3).

The structure has the following intended functions for 10 CFR 54.4(a)(2).

- Maintain structural integrity such that radiation monitors R46 and R53 intended function is not impacted.

### *Refueling Water Storage Tanks Foundation (IP2/3)*

For both Unit 2 and Unit 3, the refueling water storage tank foundation provides the main support for the 350,000 gallon refueling water storage tank. The tank supplies borated water to the refueling canal, safety injection pumps, the residual heat removal pumps, and the containment spray pumps for the loss-of-coolant accident. The refueling water storage tank foundation is a seismic Class I reinforced concrete foundation supported on bedrock.

These structures have the following intended functions for 10 CFR 54.4(a)(1) and (a)(3).

- Maintain structural integrity such that the refueling water storage tank intended function is not impacted.

These structures have no intended functions for 10 CFR 54.4(a)(2).

*Security Access and Office Building (IP3)*

The security access and office building located west of the service admin complex provides offices for personnel and contains the security generator, which is credited as a source of backup power to the station security lighting system. For Unit 3, this lighting provides illumination for exterior access and egress in the event of an Appendix R fire and a loss of the site's offsite power.

The security access building is a multi-story structure consisting of structural steel framing with exterior wood siding supported by a reinforced concrete foundation.

The structure has no intended function for 10 CFR 54.4(a)(1) or (a)(2).

The structure has the following intended function for 10 CFR 54.4(a)(3), which is performed by the security access building.

- Maintain integrity such that the components credited for Unit 3 Appendix R fire protection (10 CFR 50.48) are not impacted.

*Superheater Building (IP1)*

The Unit 1 superheater building is adjacent to but physically separated from the control building. The superheater stack is located on top of the superheater building. The structure contains the technical support center, provides office area for personnel, supports alternate safe shutdown system (ASSS) components, and houses a safety-related battery room. The structure of the superheater building consists of steel framing on a reinforced concrete mat. The floors are comprised partly of metal grating and partly of reinforced concrete slabs. The exterior walls are masonry or metal siding. The superheater building was originally classified as seismic Class III, but it is utilized by Unit 2 in a safety function and is now classified as seismic Class I.

This structure has the following intended functions for 10 CFR 54.4(a)(1), (a)(2), and (a)(3).

- Provide shelter and protection for safety-related equipment. This function is performed by the seismic Class I portion of the building.
- Maintain integrity of the Unit 1 structure such that the Unit 2 structure is not affected.

*Superheater Stack (IP1)*

The superheater stack is located on top of the superheater building. The steel stack carries the exhaust from the superheaters and also supports a ventilation duct carrying the exhaust from the containment structure. The failure of the stack could result in damage to the Unit 2 control building, the emergency diesel generator building, and in-scope Unit 3 structures. To minimize this risk, the stack was shortened and its support structure reinforced to satisfy IP3 tornado protection criteria.

The stack is constructed of riveted steel plates of varying thicknesses and has an inner lining of granite. A carbon steel ventilation duct inside the stack rises and extends a distance above the top of the stack. The stack is support by structural steel framing and access is provided by metal grating platforms along the height of the stack.

This structure has the following intended functions for 10 CFR 54.4(a)(1) and (a)(2).

- Maintaining integrity such that safety-related equipment is not affected.

This structure has no intended functions for 10 CFR 54.4(a)(3).

*Transformer/Switchyard Support Structures*

The offsite power source required to support SBO recovery actions is the source fed through one of the station auxiliary transformers. Specifically, the path includes the 138 kV and 345 kV switchyard circuit breakers feeding either station auxiliary transformers.

The purpose of the transformer/switchyard support structures is to provide physical support to the station auxiliary transformers and the other switchyard components in the SBO recovery path. These support structures include the transformer foundations and support steel, transformer pothead foundations and support steel, and foundations for the associated switchyard breakers.

Based on NRC guidance in NUREG-1800 Section 2.5.2.1.1, systems and structures relied upon to restore offsite AC power (including the onsite portion of the offsite power sources) and onsite AC power are included within the license renewal scope for SBO (10 CFR 50.63). Therefore, the transformer support structures are within the scope of license renewal based on the criterion of 10 CFR 54.4(a)(3).

The transformer/switchyard support structures have no intended functions for 10 CFR 54.4(a)(1) or (a)(2).

The transformer/switchyard support structures have the following intended function for 10 CFR 54.4(a)(3).

- Provide support for equipment credited for station blackout (10 CFR 50.63).

*Transmission Towers (SBO Recovery Path) and Foundations*

Transmission towers (SBO recovery path) and foundations perform a function that demonstrates compliance with the Commission's regulations for station blackout. IPEC transmission towers are of galvanized steel construction supported on reinforced concrete foundations.

These transmission towers are part of the path to restore off-site power, which, based on guidance in NUREG-1800 Section 2.5.2.1.1, is an intended function for the station blackout regulated event.

The transmission towers have no intended functions for (10 CFR 54.4(a)(1) or (a)(2).

The transmission towers have the following intended function for 10 CFR 54.4(a)(3).

- Provide support for recovery of off-site power for station blackout (10 CFR 50.63).

*Turbine Building (IP1/2/3) and Heater Bay (IP2/3)*

The Unit 1 turbine building is an extension of the Unit 2 turbine building and is integrally attached to the superheater building and the Unit 2 turbine building. The structure is classified as seismic Class III but was analyzed to ensure that there is no potential for gross structural collapse as a result of a design basis event. Equipment and components on the Unit 1 operating floor have been removed and the supporting systems for these components are not in service. The facility houses the station blackout/Appendix R diesel and two fire water pumps, along with their associated components relied upon in the site's safe shutdown analysis.

The building is constructed of heavy structural steel framing with steel supported reinforced concrete slabs forming the floor area. Crane rails located within Unit 1 extending the entire length of the structure also provide support for Unit 2. The building's exterior face is constructed of metal-sandwich panels and concrete brick.

The Unit 1 turbine building has no intended functions for 10 CFR 54.4(a)(1).

The Unit 1 turbine building has the following intended function for 10 CFR 54.4(a)(2) and (a)(3).

- Maintain integrity such that the seismic Class I control building is not affected.
- Provide structural support for components required to meet Appendix R safe shutdown analysis.

The Unit 2 turbine building and heater bay is an extension of the Unit 1 turbine building. The structure is similar to Unit 1 and is seismic Class III. Although the turbine building and heater bay are seismic Class III structures, the structure was analyzed to ensure that there is no potential for gross structural collapse as a result of a design basis event. The turbine building is integrally attached to the superheater building and the Unit 1 turbine building. The building houses the Unit 2 turbine generator, feedwater heaters, and their supporting systems, as well as cabling, switchgear, and other equipment associated with the station blackout/Appendix R diesel. The building is constructed of structural steel framing with steel supported reinforced concrete slabs forming the floor area. The foundation is on pier footings supported by bedrock. The building's exterior face is constructed of metal-sandwich panels and brick. The crane rail extends the entire length of the structure and is used in support of Unit 2.

The Unit 2 turbine building has no intended functions for (10 CFR 54.4(a)(1).

The Unit 2 turbine building has the following intended functions for 10 CFR 54.4(a)(2) and (a)(3).

- Maintain integrity such that the seismic Class I control building is not affected.
- Provide support for equipment credited for station blackout (10 CFR 50.63) and Appendix R safe shutdown (10 CFR 50.48).

The Unit 3 turbine building and heater bay is a seismic Class III structure and houses the turbine generator and associated auxiliaries. The structure's design is such that it will not affect Class I structures. The building consists of structural steel framing with insulated metal siding and composite metal roof decking. A 175-ton capacity main lift bridge crane provides service for the generator and related equipment. The structure is supported on pier and slab foundations supported on bedrock. The discharge structure canal runs below and connects with the common structure for Unit 2. The building provides the ability to secure doors and openings to minimize the possibility of fire to the adjacent seismic Class I structures.

The Unit 3 turbine building has no intended functions for 10 CFR 54.4(a)(1).

The Unit 3 turbine building has the following intended functions for 10 CFR 54.4(a)(2) and (a)(3).

- Maintain integrity such that the seismic Class I structures are not affected.
- Provide support for components credited in Appendix R analysis (10 CFR 50.48).

_Utility Tunnel_

The utility tunnel is a seismic Class III structure. The tunnel provides shelter and protection for the city water supply piping used for auxiliary feedwater backup water and other miscellaneous functions. The utility tunnel is a rectangular reinforced concrete structure founded on rock.

There is no safe shutdown equipment in utility tunnel.

This structure has the following intended function for 10 CFR 54.4(a)(1), (a)(2), and (a)(3).

- Provide protection for nonsafety equipment credited for mitigation of an accident or site transient.
- Maintain integrity such that the seismic Class I structures are not affected.

*Waste Holdup Tank Pit (IP2/3)*

The Unit 2 waste holdup tank pit (WHTP) is located adjacent to the refueling water tank and the top slab provides support for the boric acid evaporator building. The Unit 3 waste holdup tank pit is two structures, joined to form a single structure. It is located adjacent to the primary water storage tank and the radioactive machine shop. The WHTPs house liquid waste holdup tanks which serve as the collection point for liquid radwaste. A sump is provided to service the water tanks.

Both pit structures are reinforced concrete underground facilities supported on bedrock. The roof of the WHTP is a reinforced concrete slab placed on a steel deck and supported on steel beams. A second concrete slab is placed on top of the initial slab to provide shielding against radiation from the tank pit to the outside.

There is no safe shutdown equipment in the waste holdup tank pits.

The structures have no intended functions for 10 CFR 54.4(a)(1) or (a)(3).

The structures have the following intended functions for 10 CFR 54.4(a)(2).

- Provide functional support to nonsafety-related components whose failure could result in potential offsite releases.

UFSAR References

Auxiliary feedwater pump building: Unit 2 UFSAR Section 1.11.4.12

Electrical tunnels: Unit 2 UFSAR Section 7.2.4.1.4, Fig 7.2-24; Unit 3 UFSAR Section 8.4

Fan house: Unit 3 UFSAR Section 9.6.2.9 provides functional description.

Fuel storage buildings: Unit 2 UFSAR Sections 1.3.8 and 9.5.2 (discusses spent fuel storage pit); Section 1.11.6 (provides structural evaluation)

Liquid radwaste storage facility: Unit 3 UFSAR Section 11.1.2.1

Superheater building: Unit 2 UFSAR Section 1.11.6 (discusses seismic requirements)

Unit 2 turbine building:  Unit 2 UFSAR Section 1.11.6 (discusses seismic evaluation for impact to Class I)

Unit 3 turbine building:  Unit 3 UFSAR Section 9.6.2 (discusses 10 CFR 50.48 requirements)

Components Subject to Aging Management Review

Structural commodities are structural members that support or protect plant equipment including system components, piping, and electrical raceways.  Structural commodities that are unique to the turbine building, control building complex, and yard structures are included in this review. Those that are common to IPEC in-scope systems and structures (i.e., anchors, embedments, component and piping supports, instrument panels, racks, cable trays, and conduits) are reviewed with the bulk commodities (Section 2.4.4).

Table 2.4-3 lists the component types that require aging management review.

Table 3.5.2-3 provides the results of the aging management review.

## 2.4.4 Bulk Commodities

Description

Bulk commodities subject to aging management review are structural components or commodities that perform or support intended functions of in-scope systems, structures and components (SSCs). Bulk commodities unique to a specific structure are included in the review for that structure (Sections 2.4.1 through 2.4.3). Bulk commodities common to IPEC in-scope SSCs (e.g., anchors (including rock bolts), embedments, pipe and equipment supports, instrument panels and racks, cable trays, and conduits) are addressed in this section.

Bulk commodities have the following intended functions for 10 CFR 54.4(a)(1), (a)(2), and (a)(3).

- Provide support, shelter and protection for safety-related equipment and nonsafety-related equipment within the scope of license renewal.

Insulation may have the specific intended functions of (1) controlling the heat load during design basis accidents in areas with safety-related equipment, (insulation, or Insulation) or (2) maintaining integrity such that falling insulation does not damage safety-related equipment (reflective metallic-type reactor vessel insulation) (support of nonsafety-related equipment, or Support for Criterion (a)(2) equipment).

UFSAR References

None

Components Subject to Aging Management Review

Insulation is subject to aging management review if it performs an intended function as described above.

Table 2.4-4 lists the component types that require aging management review.

Table 3.5.2-4 provides the results of the aging management review.

### Table 2.4-1
### Containment Building
### Components Subject to Aging Management Review

| Component | Intended Function[1] |
|---|---|
| *Steel and Other Metals* | |
| Bellows penetration | Pressure boundary<br>Support for Criterion (a)(1) equipment |
| Jib cranes | Support for Criterion (a)(2) equipment |
| Electrical penetration sleeves | Pressure boundary<br>Support for Criterion (a)(1) equipment |
| Equipment hatch | Shelter or protection<br>Pressure boundary<br>Support for Criterion (a)(1) equipment |
| Fuel transfer tube penetration | Pressure boundary<br>Support for Criterion (a)(1) equipment |
| Liner plate and integral attachments | Pressure boundary<br>Support for Criterion (a)(1) equipment |
| Liner plate insulation jacket | Shelter or protection<br>Insulation |
| Manipulator crane, crane rails and girders | Support for Criterion (a)(2) equipment |
| Mechanical penetration sleeves | Pressure boundary<br>Support for Criterion (a)(1) equipment |
| Monorails | Support for Criterion (a)(2) equipment |
| Personnel lock | Shelter or protection<br>Pressure boundary<br>Support for Criterion (a)(1) equipment |
| Polar crane, rails and girders | Support for Criterion (a)(1) equipment |
| Pressurizer support framing | Support for Criterion (a)(1) equipment |
| Reactor coolant pump framing | Support for Criterion (a)(1) equipment |
| Reactor vessel support framing (ring girder) | Support for Criterion (a)(1) equipment |

## Table 2.4-1
## Containment Building
## Components Subject to Aging Management Review
## (Continued)

| Component | Intended Function[1] |
|---|---|
| Reactor vessel support framing | Support for Criterion (a)(1) equipment |
| Refueling canal liner plate | Shelter or protection<br>Support for Criterion (a)(1) equipment |
| Structural steel: beams, columns, plates, trusses | Missile barrier<br>Shelter or protection<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment |
| Sump liner and penetrations | Pressure boundary<br>Shelter or protection<br>Support for Criterion (a)(1) equipment |
| Sump screens, strainer and flow barriers | Shelter or protection<br>Support for Criterion (a)(1) equipment |
| *Concrete* | |
| Beams, columns, interior walls, slabs | Missile barrier<br>Shelter or protection<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment |
| Biological shield - pressurizer | Missile barrier<br>Shelter or protection<br>Support for Criterion (a)(1) equipment |
| Cylinder wall below grade (exterior) | Flood barrier<br>Pressure boundary<br>Support for Criterion (a)(1) equipment |
| Dome, cylinder wall, basemat | Fire barrier<br>Missile barrier<br>Pressure boundary<br>Support for Criterion (a)(1) equipment |
| Foundation, subfoundation | Flood barrier<br>Pressure boundary<br>Support for Criterion (a)(1) equipment |

# Table 2.4-1
# Containment Building
# Components Subject to Aging Management Review
# (Continued)

| Component | Intended Function[1] |
|---|---|
| Reactor vessel support (concrete portion) | Support for Criterion (a)(1) equipment |
| Refuel canal slab and walls | Shelter or protection<br>Pressure boundary<br>Support for Criterion (a)(1) equipment |
| Ring wall | Shelter or protection<br>Missile barrier<br>Support for Criterion (a)(1) equipment |
| Sumps | Pressure boundary<br>Support for Criterion (a)(1) equipment |
| *Other Materials* | |
| Equipment hatch and personnel lock seals | Pressure boundary<br>Support for Criterion (a)(1) equipment |
| Electrical penetration sealant | Pressure boundary<br>Support for Criterion (a)(1) equipment |
| Lubrite sliding surfaces | Support for Criterion (a)(1) equipment |
| Moisture barrier | Shelter or protection<br>Support for Criterion (a)(1) equipment |

1. Intended functions are defined in Table 2.0-1.

## Table 2.4-2
## Water Control Structures
## Components Subject to Aging Management Review

| Component | Intended Function[1] |
|---|---|
| *Steel and Other Metals* | |
| Jib cranes | Support for Criterion (a)(2) equipment |
| Structural steel | Shelter or protection<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment |
| *Concrete* | |
| Beams, columns, floor slabs and walls (above grade) | Heat sink<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment |
| Beams, columns, floor slabs and walls (below grade) | Heat sink<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment |
| Exterior walls below grade | Heat sink<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment |
| Foundation | Heat sink<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment |
| Masonry wall | Support for Criterion (a)(3) equipment |

1. Intended functions are defined in Table 2.0-1.

## Table 2.4-3
## Turbine Buildings, Auxiliary Buildings, and Other Structures Components Subject to Aging Management Review

| Component | Intended Function[1] |
|---|---|
| *Steel and Other Metals* | |
| Control room ceiling support system | Support for Criterion (a)(2) equipment |
| Crane rails and girders | Support for Criterion (a)(2) equipment |
| Emergency lighting poles | Support for Criterion (a)(3) equipment |
| Fire protection panels | Fire barrier |
| Metal siding | Shelter or protection<br>Fire barrier<br>Support for Criterion (a)(3) equipment |
| Monorails | Support for Criterion (a)(2) equipment |
| New fuel storage racks | Shelter or protection<br>Support for Criterion (a)(1) equipment |
| Roof decking | Fire barrier<br>Support for Criterion (a)(3) equipment |
| Spent fuel pit bridge crane, rails and girders | Support for Criterion (a)(2) equipment |
| Spent fuel pool liner plate and gate | Shelter or protection<br>Support for Criterion (a)(1) equipment |
| Spent fuel pool storage racks | Support for Criterion (a)(1) equipment |
| Structural steel: beams, columns, plates | Shelter or protection<br>Missile barrier<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Superheater stack | Support for Criterion (a)(2) equipment |
| Transmission towers | Support for Criterion (a)(3) equipment |

### Table 2.4-3
### Turbine Buildings, Auxiliary Buildings, and Other Structures Components Subject to Aging Management Review
### (Continued)

| Component | Intended Function[1] |
|---|---|
| *Concrete* | |
| Duct banks | Shelter or protection<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(3) equipment |
| Exterior walls | Shelter or protection<br>Fire barrier<br>Missile barrier<br>Pressure boundary<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Exterior walls-below grade | Shelter or protection<br>Fire barrier<br>Missile barrier<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Floor slabs, interior walls, and ceilings | Shelter or protection<br>Fire barrier<br>Missile barrier<br>Pressure boundary<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Foundations (transmission towers, buildings, transformers, tanks, circuit breakers, emergency lighting poles) | Shelter or protection<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(3) equipment |
| Manholes | Shelter or protection<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(3) equipment |

### Table 2.4-3
### Turbine Buildings, Auxiliary Buildings, and Other Structures Components Subject to Aging Management Review
### (Continued)

| Component | Intended Function[1] |
|---|---|
| Masonry walls | Shelter or protection<br>Fire barrier<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Roof slab | Shelter or protection<br>Fire barrier<br>Missile barrier<br>Pressure boundary<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Shield wall | Missile barrier<br>Shelter or protection<br>Support for Criterion (a)(2) equipment |

1. Intended functions are defined in Table 2.0-1.

## Table 2.4-4
## Bulk Commodities
## Components Subject to Aging Management Review

| Component | Intended Function[1] |
|---|---|
| *Steel and Other Metals* | |
| Anchorage / embedments | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Base plates | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Cable tray | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Cable trays support | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Component and piping supports for ASME Class 1, 2, 3 and MC | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Component and piping supports | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Conduits | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Conduit supports | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Damper framing | Fire barrier<br>Support for Criterion (a)(3) equipment |
| Electrical and instrument panels and enclosures | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |

### Table 2.4-4
### Bulk Commodities
### Components Subject to Aging Management Review
### (Continued)

| Component | Intended Function[1] |
|---|---|
| Fire doors | Fire barrier |
| Fire hose reels | Support for Criterion (a)(3) equipment |
| Flood, pressure and specialty doors | Shelter or protection<br>Flood barrier<br>Missile barrier<br>Pressure boundary |
| HVAC duct supports | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Instrument line supports | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Instrument racks, frames and tubing trays | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Insulation jacket | Insulation<br>Support for Criterion (a)(2) equipment |
| Manways, hatches and hatch covers | Shelter or protection<br>Flood barrier<br>Missile barrier<br>Pressure boundary<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Missile shields | Shelter or protection<br>Missile barrier |
| Penetration sleeves (mechanical/ electrical not penetrating containment boundary) | Flood barrier<br>Support for Criterion (a)(1) equipment,<br>Support for Criterion (a)(2) equipment |

# Table 2.4-4
# Bulk Commodities
# Components Subject to Aging Management Review
# (Continued)

| Component | Intended Function[1] |
|---|---|
| Pipe whip restraints | Shelter or protection<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment |
| Stairway, handrail, platform, grating, decking, and ladders | Support for Criterion (a)(2) equipment |
| Vents and louvers | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| *Bolted Connections* | |
| Anchor bolts | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| ASME Class 1, 2, 3 and MC Supports bolting | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Structural bolting | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| *Concrete* | |
| Equipment pads/foundations | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| Fire proofing | Fire barrier |
| Manways, hatches and hatch covers | Fire barrier<br>Flood barrier<br>Pressure boundary<br>Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |

## Table 2.4-4
## Bulk Commodities
## Components Subject to Aging Management Review
## (Continued)

| Component | Intended Function[1] |
|---|---|
| Missile shields | Missile barrier |
| Support pedestals | Support for Criterion (a)(1) equipment<br>Support for Criterion (a)(2) equipment<br>Support for Criterion (a)(3) equipment |
| *Other Materials* | |
| Fire barrier penetration seal | Shelter or protection<br>Fire barrier<br>Pressure boundary |
| Fire stops | Fire barrier |
| Fire wrap | Fire barrier |
| Insulation | Insulation<br>Support for Criterion (a)(2) equipment |
| Seals and gaskets (floors, doors, manways and hatches) | Pressure boundary<br>Support for Criterion (a)(1) equipment |
| Water stops | Flood barrier |

1. Intended functions are defined in Table 2.0-1.

## 2.5 SCOPING AND SCREENING RESULTS: ELECTRICAL AND INSTRUMENTATION AND CONTROL SYSTEMS

### Description

As stated in Section 2.1.1, plant electrical and instrument and control (I&C) systems are included in the scope of license renewal as are electrical and I&C components in mechanical systems. The default inclusion of plant electrical and I&C systems in the scope of license renewal reflects the method used for the integrated plant assessments (IPA) of electrical systems, which is different from the methods used for mechanical systems and structures.

The basic philosophy used in the electrical and I&C components IPA is that components are included in the review unless they are specifically screened out. When used with the plant spaces approach, this method eliminates the need for unique identification of every component and its specific location. This assures components are not improperly excluded from an aging management review.

The electrical and I&C IPA began by grouping the total population of components into commodity groups. The commodity groups include similar electrical and I&C components with common characteristics. Component level intended functions of the commodity groups were identified.

During the IPA, commodity groups and specific plant systems were eliminated from further review as the intended functions of commodity groups were examined.

In addition to the plant electrical systems, certain switchyard components required to restore offsite power following a station blackout were conservatively included within the scope of license renewal even though those components are not relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for station blackout (SBO) (10 CFR 50.63). The evaluation boundaries of the offsite power system are described below.

The purpose of the offsite power system (Figure 2.5-2 and Figure 2.5-3) is to provide the electrical interconnection between IPEC and the offsite transmission network.

### UFSAR References

Additional details for electrical commodities can be found in UFSAR Chapters 7 and 8 for both IP2 and IP3.

### Evaluation Boundaries

Plant electrical and instrument and control systems are included in the scope of license renewal as are electrical and I&C components in mechanical systems.

The offsite power sources required to support SBO recovery actions are the offsite sources that supply the station auxiliary transformers. Specifically, the offsite power recovery path includes the station auxiliary transformers, the 138KV switchyard circuit breakers supplying the station auxiliary transformers, the circuit breaker-to-transformer and transformer-to-onsite electrical distribution interconnections, and the associated control circuits and structures.

Components Subject to AMR

As discussed in Section 2.1.2.3.1, IPEC electrical commodity groups correspond to two of the commodity groups identified in NEI 95-10. The two commodity groups are

- high-voltage insulators, and
- cables and connections, bus, electrical portions of electrical and I&C penetration assemblies, fuse holders outside of cabinets of active electrical SCs.

The commodity group cables, connections, bus, and electrical portions of I&C penetration assemblies is further divided into the following.

- cable connections (metallic parts)
- electrical cables and connections subject to 10 CFR 50.49 EQ requirements
- electrical cables and connections not subject to 10 CFR 50.49 EQ requirements
- electrical cables and connections not subject to 10 CFR 50.49 EQ requirements used in instrumentation circuits
- electrical connections not subject to 10 CFR 50.49 EQ requirements exposed to borated water leakage
- fuse holders – insulation material
- fuse holders – metallic clamp
- inaccessible medium-voltage (2 kV to 35 kV) cables (e.g., installed underground in conduit or direct buried) not subject to 10 CFR 50.49 EQ requirements
- metal enclosed bus – bus / connections
- metal enclosed bus – enclosure assemblies
- metal enclosed bus – insulation / insulators
- switchyard bus and connections
- transmission conductors and connections
- uninsulated ground conductors
- 138kV direct burial insulated transmission cables

Each of these commodity groups is subject to aging management review with the following exceptions.

- Electrical cables and connections subject to 10 CFR 50.49 EQ requirements are not subject to aging management review since the components are replaced based on qualified life.

- Fuse holders with metallic clamps are either part of a complex active assembly or part of circuits that perform no license renewal intended function.
- Uninsulated ground conductors limit equipment damage in the event of a circuit failure, but do not perform an intended function for license renewal.

Table 2.5-1 lists the component types that require aging management review.

Table 3.6.2-1 provides the results of the aging management review.

### Table 2.5-1
### Electrical and Instrumentation and Control Systems Components Subject to Aging Management Review

| Structure and/or Component/Commodity | Intended Function[1] |
|---|---|
| Cable connections (metallic parts) | Conducts electricity |
| Electrical cables and connections not subject to 10 CFR 50.49 EQ requirements | Conducts electricity |
| Electrical cables not subject to 10 CFR 50.49 EQ requirements used in instrumentation circuits | Conducts electricity |
| Electrical connections not subject to 10 CFR 50.49 EQ requirements exposed to borated water leakage | Conducts electricity |
| Fuse holders (insulation material) | Conducts electricity |
| High voltage insulators for SBO recovery | Insulation (electrical) |
| Inaccessible medium-voltage (2KV to 35KV) cables not subject to 10 CFR 50.49 EQ requirements | Conducts electricity |
| Metal-enclosed bus (non-segregated) and connections for SBO recovery | Conducts electricity |
| Metal-enclosed bus (non-segregated), insulation/insulators for SBO recovery | Insulation (electrical) |
| Metal-enclosed bus (non-segregated) enclosure assemblies for SBO recovery | Support for Criterion (a)(3) equipment |
| Switchyard bus and connections for SBO recovery | Conducts electricity |
| Transmission conductors and connections for SBO recovery | Conducts electricity |
| 138kV direct burial insulated transmission cables | Conducts electricity |

1. Intended functions are defined in Table 2.0-1.

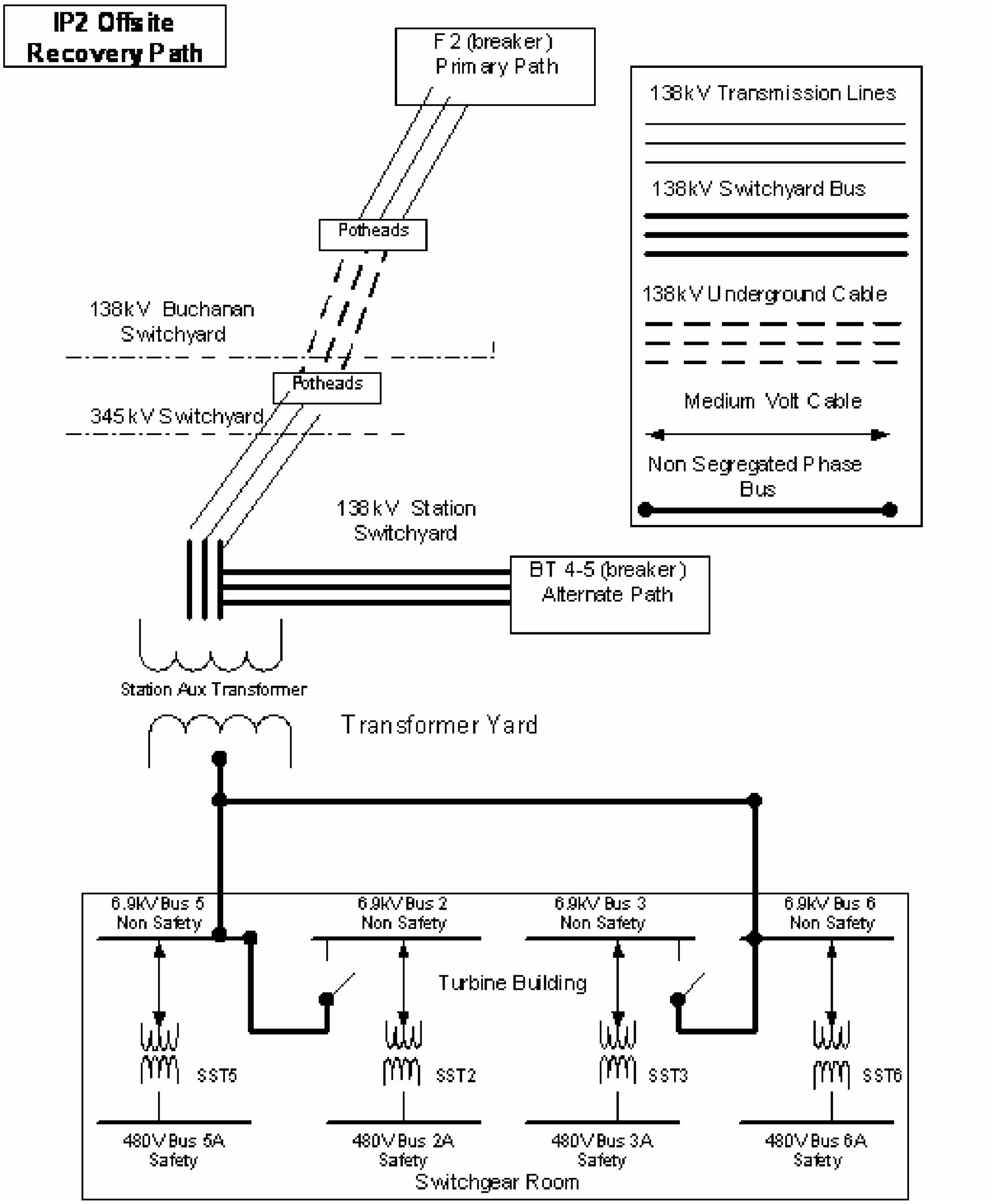

**Figure 2.5-2**
**IP2 Offsite Power Scoping Diagram**

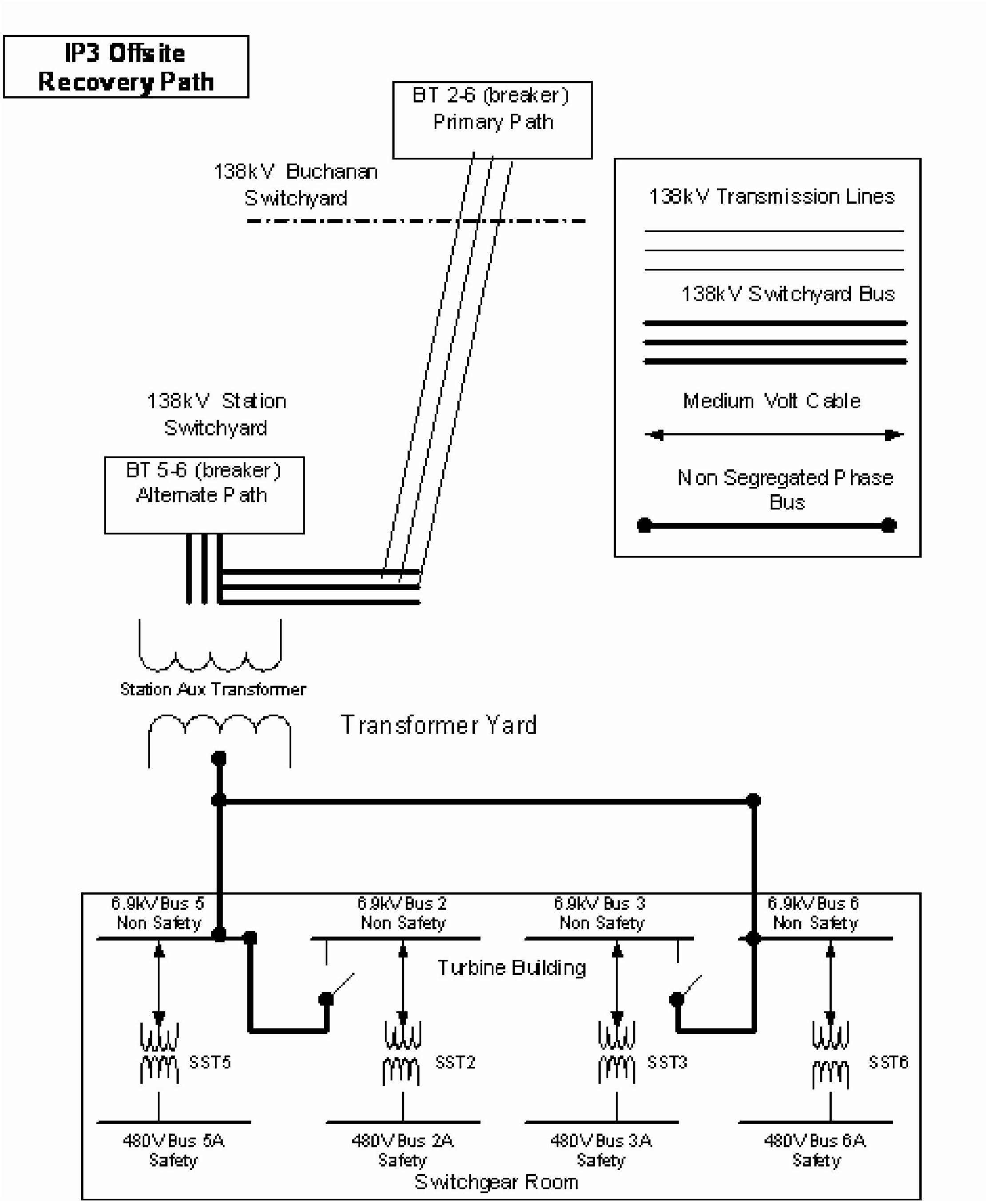

**Figure 2.5-3**
**IP3 Offsite Power Scoping Diagram**

# 3.0 AGING MANAGEMENT REVIEW RESULTS

This section provides results of the aging management review (AMR) for structures and components identified in Section 2 as subject to aging management review. Tables 3.0-1, 3.0-2, and 3.0-3 provide descriptions of the mechanical, structural, and electrical service environments, respectively, used in the AMRs to determine aging effects requiring management.

Results of the AMRs are presented in the following two table types.

- **Table 3.x.1** where

  **3** indicates the table pertaining to a Section 3 aging management review,

  **x** indicates the table number from NUREG-1801 (Reference 3.0-2), Volume 1, and

  **1** indicates that this is the first table type in Section 3.x.

For example, in the reactor coolant system section, this is Table 3.1.1, and in the engineered safety features section, this is Table 3.2.1. For ease of discussion, these table types will hereafter be referred to as "Table 1." These tables are derived from the corresponding tables in NUREG-1801, Volume 1, and present summary information from the AMRs.

- **Table 3.x.2-y-IPu** where

  **3** indicates the application section number,

  **x** indicates the table number from NUREG-1801, Volume 1,

  **2** indicates that this is the second table type in Section 3.x,

  **y** indicates the system table number, and

  **IPu** indicates the unit, as necessary (IP2 or IP3). If a table encompasses both units, as with structures, this number is omitted.

For example, within the reactor coolant system section, the AMR results for the reactor vessel are presented in Tables 3.1.2-1-IP2 and 3.1.2-1-IP3, and the results for the reactor vessel internals are in Tables 3.1.2-2-IP2 and 3.1.2-2-IP3. In the engineered safety features section, the residual heat removal systems results are presented in Tables 3.2.2-1-IP2 and 3.2.2-1-IP3, and the containment spray systems are in Tables 3.2.2-2-IP2 and 3.2.2-2-IP3. For ease of discussion, these table types will hereafter be referred to as "Table 2s." These tables present the results of the AMRs.

## TABLE DESCRIPTION

NUREG-1801 contains the NRC Staff's generic evaluation of existing plant programs. It documents the technical basis for determining whether existing programs are adequate without modification or should be augmented for the extended period of operation. Evaluation results documented in the report indicate that many existing programs are adequate, without modification, to manage the aging effects for particular structures or components within the scope of license renewal. The report also contains recommendations on specific areas for which existing programs should be augmented for license renewal.

NUREG-1801 is split into two volumes. Volume 1 contains tables that summarize the aging management reviews that are discussed in Volume 2. Volume 2 provides tables that document generic aging management reviews (AMRs) of SSC that may be within the scope of license renewal and identify NUREG-1801 aging management programs (AMPs) that are acceptable to manage the listed aging effects. The staff has reviewed the aging effects on typical components and structures, identified the relevant existing programs, and evaluated program attributes to manage aging effects for license renewal.

To take full advantage of NUREG-1801, IPEC AMR results have been compared with information set forth in the tables of NUREG-1801. Results of that comparison are provided in Table 1s and Table 2s.

### Table 1

The purpose of a Table 1 is to provide a summary comparison of how the IPEC AMR results align with the corresponding table of NUREG-1801, Volume 1. These tables are essentially the same as Tables 1 through 6 provided in NUREG-1801, Volume 1, with the following exceptions.

- The ID column is labeled "Item Number" and the number has been expanded to include the table number.
- The "Type" column has been deleted. Items applicable to BWRs only are noted as such.
- The "Related Item" column has been replaced by a "Discussion" column.

The "Item Number" column provides a means to cross-reference to Table 1 from the Table 2s.

Information in the following columns of Table 1 is taken directly from NUREG-1801, Volume 1.

- Component
- Aging Effect/Mechanism
- Aging Management Programs
- Further Evaluation Recommended

Further information is provided in the "Discussion" column. The Discussion column explains, in summary, how the IPEC evaluations align with NUREG-1801, Volume 1. The following are examples of information that might be contained within this column:

- any "Further Evaluation Recommended" information or reference to the location of that information;
- the name of a plant-specific program being used;
- exceptions to the NUREG-1801 assumptions;
- a discussion of how the line item is consistent with the corresponding line item in NUREG-1801, Volume 1, when it may not be intuitively obvious;
- a discussion of how the line item is different from the corresponding line item in NUREG-1801, Volume 1, when it may appear to be consistent.

Table 2

Table 2s provide the results of the aging management reviews for those structures and components identified in Section 2 as being subject to aging management review. There is a Table 2 for each aging management review within a NUREG-1801 system group. For example, the engineered safety features system group contains tables specific to residual heat removal, containment spray, containment isolation support, safety injection, and containment penetrations.

Each Table 2 consists of the following nine columns.

*Component Type*

Column 1 identifies the component types from Section 2 of this application that are subject to aging management review.

The term "piping" in component lists may include pipe, pipe fittings (such as elbows and reducers), flow elements, orifices, and thermowells. If such components have unique tag numbers or the specific component has a function other than pressure boundary, then flow elements, orifices and thermowells are identified as a separate component type.

The term "heat exchanger (shell)" may include the bonnet/channel head and tubesheet. In cases where the bonnet/channel head and tubesheet provide a unique material and environment combination, they will be uniquely identified as a separate component type.

*Intended Function*

Column 2 identifies the license renewal intended functions (using abbreviations where necessary) for the listed component types. Definitions and abbreviations of intended functions are listed in Table 2.0-1 in Section 2.

*Material*

Column 3 lists the particular materials of construction for the component type being evaluated.

### *Environment*

Column 4 lists the environment to which the component types are exposed. Internal and external service environments are indicated. A description of these environments is provided in Tables 3.0-1, 3.0-2, and 3.0-3 for mechanical, structural, and electrical components, respectively.

### *Aging Effect Requiring Management*

Column 5 lists the aging effects requiring management for material and environment combinations for each component type.

### *Aging Management Programs*

Column 6 lists the programs used to manage the aging effects requiring management.

### *NUREG-1801, Vol. 2, Item*

Each combination of the following factors listed in Table 2 is compared to NUREG-1801, Volume 2, to identify consistencies.

- component type
- material
- environment
- aging effect requiring management
- aging management program

Column 7 documents identified consistencies by noting the appropriate NUREG-1801, Volume 2, item number. If there is no corresponding item number in NUREG-1801, Volume 2, for a particular combination of factors, column 7 is left blank.

Comparisons of system and structure aging management results to NUREG-1801 Volume 2 items are generally within the corresponding system group and preferably within the specific system or structure. For example, aging management results for the containment spray system will generally be compared to NUREG-1801, Volume 2 ESF system results in Chapter V, and preferably to items in Table V.A for the containment spray system for PWRs. In some cases, where a particular aging management review result has no valid comparison within the system group, a comparison is made outside the system group. For example, a material, environment, aging effect and program combination in the containment spray aging management results may have no comparable item in the NUREG-1801, Volume 2 ESF system results, but a match can be found in the auxiliary systems tables.

### *Table 1 Item*

Column 8 lists the corresponding line item from Table 1. If there is no corresponding item in NUREG-1801, Volume 1, then column 8 is left blank.

Each combination of the following that has an identified NUREG-1801, Volume 2 item number also has a Table 1 line item reference number.

- component type
- material
- environment
- aging effect requiring management
- aging management program

*Notes*

Column 9 contains notes that are used to describe the degree of consistency with the line items in NUREG-1801, Volume 2. Notes that use letter designations are standard notes based on Appendix F of NEI 95-10 (Reference 3.0-3). Notes that use numeric designators are specific to the plant site.

Many of the NUREG-1801 evaluations refer to plant-specific programs. In these cases, Note E is used for correlations between the combination in Table 2 and a combination for a line item in NUREG-1801, Volume 2.

## FURTHER EVALUATION REQUIRED

The Table 1s in NUREG-1801 indicate that further evaluation is necessary for certain aging effects and other issues discussed in NUREG-1800 (Reference 3.0-1). Section 3 includes discussions of these issues numbered in accordance with the discussions in NUREG-1800. The discussions explain the site's approach to these areas requiring further evaluation.

## REFERENCES

3.0-1 NUREG-1800, *Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants*, Revision 1, U. S. Nuclear Regulatory Commission, September 2005.

3.0-2 NUREG-1801, *Generic Aging Lessons Learned (GALL) Report*, Volumes 1 and 2, Revision 1, U. S. Nuclear Regulatory Commission, September 2005.

3.0-3 NEI 95-10, *Industry Guideline for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule*, Revision 6, Nuclear Energy Institute (NEI), June 2005.

## Table 3.0-1
## Service Environments for Mechanical Aging Management Reviews

| **Environment** | **Description** |
|---|---|
| *Class 1 Mechanical Environments* | |
| Air – indoor | Indoor air. |
| Neutron fluence | Neutron flux integrated over time. Neutron fluence is specified as an environment for the limiting reactor vessel components with material properties that may be significantly affected by neutron irradiation. |
| Treated water | Treated or demineralized water[1] |
| Treated water > 140°F | Treated or demineralized water above stress corrosion cracking (SCC) threshold for stainless steel. Steam is considered treated water. |
| Treated borated water | Treated or demineralized borated water |
| Treated borated water > 140°F | Treated or demineralized borated water above stress corrosion cracking (SCC) threshold for stainless steel. |
| Treated borated water > 482°F | Treated or demineralized borated water above thermal embrittlement threshold for CASS. |
| *Non-Class 1 Mechanical Environments* | |
| Air – indoor | Indoor air on systems with temperatures above the dewpoint. |
| Air – outdoor | Exposed to air and local weather conditions |
| Air – treated | Air that is dried and filtered |
| Concrete | Components embedded in concrete |
| Concrete and oiled sand | Tanks sitting on a concrete and oiled sand base mat. |
| Condensation | Air and condensation on surfaces of indoor systems with temperatures below the dewpoint. For exterior surfaces, condensation is considered untreated water due to potential for surface contamination. |
| Exhaust gas | Gas present in a diesel or propane engine exhaust |
| Fire protection foam | Fluoroprotein foam concentrate stored as a liquid for combination with water for fire suppression |
| Fuel oil | Fuel oil such as used for combustion engines, boilers, etc. |

## Table 3.0-1
## Service Environments for Mechanical Aging Management Reviews

| Environment | Description |
|---|---|
| Gas | Inert gas such as carbon dioxide, Freon, Halon, nitrogen, etc. or non-corrosive gas such as propane |
| Lube oil | Lubricating oil for plant equipment |
| Raw water | Raw, untreated fresh water or water not treated by a chemistry program such as water collected in floor drains and sumps |
| Steam | Treated water that has been converted to steam |
| Soil | External environment for components buried in the soil, including groundwater in the soil |
| Treated water | Treated or demineralized water[1] |
| Treated water > 140°F | Treated water above the SCC threshold for stainless steel |
| Treated water > 482°F | Treated or demineralized water above thermal embrittlement threshold for CASS. |
| Treated borated water | Treated or demineralized borated water |
| Treated borated water > 140°F | Treated or demineralized borated water above stress corrosion cracking (SCC) threshold for stainless steel. |

1. For the aging management review process, and the Table 2 presentation of review results, "treated water" encompasses a range of water types, all of which were chemically treated or demineralized. These water types include treated water, reactor coolant, and closed cycle cooling water as defined in NUREG 1801. In the Table 2 results, the type of water can normally be inferred from the context of the result (e.g., if water chemistry control – closed cooling water is the aging management program, then the treated water is equivalent to closed cycle cooling water as defined by NUREG-1801). Where such an inference is not clear, a plant-specific note identifies the water type.

   For the comparison of the aging management review results with those of NUREG-1801, as presented in the last three Table 2 columns, and for the summary of results discussed in Table 1, the NUREG-1801 definitions of water types were used. In other words, the "treated water" listed in the results was compared to the corresponding water type of NUREG-1801. The discussions in Table 1, and in the text sections referenced in Table 1 for further evaluation, use the water types defined by NUREG-1801. In these discussions, "treated water" refers only to water controlled by the Water Chemistry Control – Primary and Secondary Program.

### Table 3.0-2
### Service Environments for Structural Aging Management Reviews

| Environment | Description |
|---|---|
| Air – indoor uncontrolled | Indoor air includes heated, ventilated, air conditioned or spaces sheltered/protected from weather. Air with temperature less than 150°F, humidity up to 100% and protected from precipitation. Air – indoor uncontrolled may contain contaminants depending on location. |
| Air – outdoor | Atmospheric air with an air temperature less than 115°F, humidity up to 100%. This environment is subject of periodic wetting and wind. |
| Air with borated water leakage | Air and untreated borated water leakage on indoor or outdoor systems with temperatures above or below the dew point. The water from leakage is considered to be untreated due to the potential for water contamination at the surface. |
| Exposed to fluid environment | Fluid environment for structures at IPEC is defined as follows.<br>• Raw water – Hudson River provides the source of raw water utilized at IPEC. Raw water is also rain or ground water. Raw water is water that has not been demineralized or chemically treated to any significant extent. Raw water may contain contaminants including boric acid depending on location. IPEC building sumps may be exposed to a variety of untreated water that is classified as raw water for the determination of aging effects.<br>• Treated water – Treated water is demineralized water or chemically purified water and is the base water for clean systems. Treated water could be deaerated and include corrosion inhibitors, biocides, or some combination of these treatments. |
| Soil | External environment for components buried in the soil, including ground water in the soil. This environment is “non-aggressive” as defined in NUREG-1801. |

## Table 3.0-3
## Service Environments for Electrical Aging Management Reviews

| Environment | Description |
|---|---|
| Air with borated water leakage | Indoor air and demineralized or chemically purified water that contains boric acid. |
| Heat and air | Indoor air at normal operating temperature. |
| Moisture and air | Indoor air at normal operating humidity. |
| Moisture and voltage stress | A wetted environment with applied voltage of 2 kV to 35 kV. Applies to underground medium-voltage cables energized at least 25% of the time. |
| Outdoor weather | Ambient outdoor conditions. |
| Radiation and air | Normal plant operating radiation levels. |
| Soil | External environment for components buried in the soil. |

# 3.1 REACTOR VESSEL, INTERNALS AND REACTOR COOLANT SYSTEM

## 3.1.1 Introduction

This section provides the results of the aging management reviews for components in the reactor vessel, internals and reactor coolant system that are subject to aging management review. The following component groups are addressed in this section (component group descriptions are available in the referenced sections).

- Reactor Vessel (Section 2.3.1.1)
- Reactor Vessel Internals (Section 2.3.1.2)
- Reactor Coolant System and Pressurizer (Section 2.3.1.3)
- Steam Generator (Section 2.3.1.4)

Table 3.1.1, Summary of Aging Management Programs for the Reactor Coolant System in Chapter IV of NUREG-1801, provides the summary of the programs evaluated in NUREG-1801 for the reactor coolant system (RCS) component groups. This table uses the format described in the introduction to Section 3. Hyperlinks are provided to the program evaluations in Appendix B.

## 3.1.2 Results

The following tables summarize the results of aging management reviews and the NUREG-1801 comparison for the reactor vessel, internals and reactor coolant system components.

- Table 3.1.2-1-IP2 Reactor Vessel—Summary of Aging Management Review

- Table 3.1.2-1-IP3 Reactor Vessel—Summary of Aging Management Review

- Table 3.1.2-2-IP2 Reactor Vessel Internals—Summary of Aging Management Review

- Table 3.1.2-2-IP3 Reactor Vessel Internals—Summary of Aging Management Review

- Table 3.1.2-3-IP2 Reactor Coolant System and Pressurizer—Summary of Aging Management Review

- Table 3.1.2-3-IP3 Reactor Coolant System and Pressurizer—Summary of Aging Management Review

- Table 3.1.2-4-IP2 Steam Generator—Summary of Aging Management Review

- Table 3.1.2-4-IP3 Steam Generator—Summary of Aging Management Review

### 3.1.2.1 Materials, Environments, Aging Effects Requiring Management and Aging Management Programs

The following sections list the materials, environments, aging effects requiring management, and aging management programs for the reactor coolant system components. Programs are described in Appendix B. Further details are provided in Tables 3.1.2-1-IP2 through 3.1.2-4-IP3.

#### 3.1.2.1.1 Reactor Vessel

**Materials**

Reactor vessel components are constructed of the following materials.

- carbon steel
- carbon steel with stainless steel or nickel alloy cladding
- nickel alloy
- stainless steel

**Environment**

Reactor vessel components are exposed to the following environments.

- air – indoor
- neutron fluence
- treated borated water
- treated borated water > 140°F

**Aging Effects Requiring Management**

The following aging effects associated with the reactor vessel require management.

- cracking
- cracking – fatigue
- loss of material
- loss of material – wear
- reduction of fracture toughness

**Aging Management Programs**

The following aging management programs manage the aging effects for reactor vessel components.

- Boric Acid Corrosion Prevention
- Flux Thimble Tube Inspection
- Inservice Inspection
- Nickel Alloy Inspection
- Reactor Head Closure Studs

- Reactor Vessel Head Penetration Inspection
- Reactor Vessel Surveillance
- Water Chemistry Control – Primary and Secondary

### 3.1.2.1.2 Reactor Vessel Internals

**Materials**

Reactor vessel internals components are constructed of the following materials.

- cast austenitic stainless steel
- nickel alloy
- stainless steel

**Environment**

Reactor vessel internals components are exposed to the following environments.

- neutron fluence
- treated borated water
- treated borated water > 140°F
- treated borated water > 482°F

**Aging Effects Requiring Management**

The following aging effects associated with the reactor vessel internals require management.

- change in dimensions
- cracking
- cracking – fatigue
- loss of material
- loss of material – wear
- loss of preload
- reduction of fracture toughness

**Aging Management Programs**

The following aging management programs manage the aging effects for reactor vessel internals components.

- Inservice Inspection
- Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS)
- Water Chemistry Control – Primary and Secondary

### 3.1.2.1.3 Reactor Coolant System and Pressurizer

**Materials**

Reactor coolant system and pressurizer components are constructed of the following materials.

- carbon steel
- carbon steel with stainless steel or nickel alloy cladding
- cast austenitic stainless steel
- nickel alloy
- stainless steel

**Environment**

Reactor coolant system and pressurizer components are exposed to the following environments.

- air – indoor
- treated borated water
- treated borated water > 140°F
- treated water (closed cycle cooling water)

**Aging Effects Requiring Management**

The following aging effects associated with the reactor coolant system and pressurizer require management.

- cracking
- cracking – fatigue
- fouling
- loss of material
- reduction of fracture toughness

**Aging Management Programs**

The following aging management programs manage the aging effects for reactor coolant system and pressurizer components.

- Bolting Integrity
- Boric Acid Corrosion Prevention
- External Surfaces Monitoring
- Inservice Inspection
- Nickel Alloy Inspection
- One-Time Inspection – Small Bore Piping
- Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)

- Water Chemistry Control – Closed Cooling Water
- Water Chemistry Control – Primary and Secondary

### 3.1.2.1.4 Steam Generator

**Materials**

Steam generator components are constructed of the following materials.

- carbon steel
- carbon steel with nickel alloy cladding
- carbon steel with stainless steel cladding
- nickel alloy
- stainless steel

**Environment**

Steam generator components are exposed to the following environments.

- air – indoor
- treated borated water
- treated borated water > 140°F
- treated water
- treated water > 140°F

**Aging Effects Requiring Management**

The following aging effects associated with the steam generator require management.

- cracking
- cracking – fatigue
- fouling
- loss of material
- loss of material – wear

**Aging Management Programs**

The following aging management programs manage the aging effects for steam generator components.

- Bolting Integrity
- Boric Acid Corrosion Prevention
- Inservice Inspection
- Steam Generator Integrity
- Water Chemistry Control – Primary and Secondary

### 3.1.2.2 Further Evaluation of Aging Management as Recommended by NUREG-1801

NUREG-1801 indicates that further evaluation is necessary for certain aging effects and other issues discussed in Section 3.1.2.2 of NUREG-1800. The following sections are numbered in accordance with the discussions in NUREG-1800 and explain the IPEC approach to these areas requiring further evaluation. Programs are described in Appendix B.

#### 3.1.2.2.1 Cumulative Fatigue Damage

Fatigue is considered a time-limited aging analysis (TLAA) as defined in 10 CFR 54.3 for the reactor vessel, selected components of the reactor vessel internals, most components of the reactor coolant pressure boundary and steam generators. TLAAs are evaluated in accordance with 10 CFR 54.21(c). The evaluation of fatigue for the reactor vessel is discussed in Section 4.3.1.1.

With the exception of the pressurizer support skirts, evaluation of the fatigue TLAA for the Class 1 portions of the reactor coolant pressure boundary piping and components, including those for interconnecting systems, is discussed in Section 4.3.1. No fatigue analysis was required for the pressurizer support skirts. Cracking, including cracking due to fatigue, will be managed by the Inservice Inspection Program for the pressurizer support skirts.

#### 3.1.2.2.2 Loss of Material Due to General, Pitting, and Crevice Corrosion

1. Loss of material due to general, pitting, and crevice corrosion in steel components of the steam generator exposed to secondary feedwater and steam is managed at IPEC by the Water Chemistry Control – Primary and Secondary Program. The effectiveness of the Water Chemistry Control – Primary and Secondary Program will be confirmed by the One-Time Inspection Program through an inspection of a representative sample of components crediting this program including areas of stagnant flow.

2. This paragraph in NUREG-1800 applies to BWRs only.

3. This paragraph in NUREG-1800 applies to BWRs only.

4. Loss of material due to general, pitting, and crevice corrosion in the steel steam generator shell and transition cone exposed to secondary feedwater and steam is managed by the Inservice Inspection and Water Chemistry Control – Primary and Secondary Programs. IPEC steam generators have been replaced. The replacement generators, Model 44F, do not have a high-stress region at the shell to transition cone weld as identified in NRC IN 90-04 and as such, additional inspection procedures are not required.

#### 3.1.2.2.3 Loss of Fracture Toughness due to Neutron Irradiation Embrittlement

1. Neutron irradiation embrittlement is a TLAA evaluated for the period of extended operation in accordance with 10 CFR 54.21(c). The evaluation of loss of fracture toughness for the reactor vessel beltline shell and welds is discussed in Section 4.2. The materials of the nozzles are not controlling for the TLAA evaluations.

2. The Reactor Vessel Surveillance Program manages reduction in fracture toughness due to neutron embrittlement of reactor vessel beltline materials. This program manages reduction in fracture toughness of reactor vessel beltline materials to assure that the pressure boundary function of the reactor pressure vessel is maintained for the period of extended operation. The program includes an evaluation of radiation damage based on pre-irradiation and post-irradiation testing of Charpy V-notch and tensile specimens from the most limiting plate used in the core region of the reactor vessel. Reports are submitted as required by 10 CFR 50, Appendix H.

#### 3.1.2.2.4 Cracking due to Stress Corrosion Cracking (SCC) and Intergranular Stress Corrosion Cracking (IGSCC)

1. This paragraph in NUREG-1800 applies to BWRs only.

2. This paragraph in NUREG-1800 applies to BWRs only.

#### 3.1.2.2.5 Crack Growth due to Cyclic Loading

This paragraph in NUREG-1800 pertains to cracking due to cyclic loading in reactor vessel SA 508-Cl 2 shell forgings where stainless steel cladding was deposited with a high heat input welding process. The IPEC vessel shell is not composed of SA 508-Cl 2 forgings with stainless steel cladding deposited with a high heat input welding process. This item is not applicable to IPEC.

#### 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 change in dimensions (void swelling) could occur in stainless steel and nickel alloy reactor vessel internals components exposed to reactor coolant and neutron flux. To manage loss of fracture toughness in vessel internals components, IPEC will (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, submit an inspection plan for reactor internals to the NRC for review and approval. This commitment is included in the UFSAR Supplement, Appendix A, Sections A.2.1.41 and A.3.1.41.

### 3.1.2.2.7 Cracking due to Stress Corrosion Cracking

1. Cracking due to SCC in the stainless steel bottom-mounted instrument guide tube components exposed to reactor coolant is managed by the Inservice Inspection and Water Chemistry Control – Primary and Secondary Programs. The Water Chemistry Control – Primary and Secondary Program minimizes contaminants which promote SCC. The Inservice Inspection Program provides periodic pressure testing of these components.

2. Cracking due to SCC in cast austenitic stainless steel (CASS) reactor coolant system piping, piping components, and piping elements exposed to reactor coolant is managed by the Water Chemistry Control – Primary and Secondary and Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Programs. The Thermal Aging Embrittlement of CASS Program includes (a) determination of the susceptibility of CASS components to thermal aging embrittlement based on casting method, molybdenum content, and percent ferrite, and (b) for “potentially susceptible” components, aging management is accomplished through either enhanced volumetric examination or plant- or component-specific flaw tolerance evaluation. These programs are supplemented by the Inservice Inspection Program for some components.

### 3.1.2.2.8 Cracking due to Cyclic Loading

1. This paragraph in NUREG-1800 applies to BWRs only.

2. This paragraph in NUREG-1800 applies to BWRs only.

### 3.1.2.2.9 Loss of Preload due to Stress Relaxation

Loss of preload due to stress relaxation (creep) would only be a concern in very high temperature applications (> 700°F) as stated in the ASME Code, Section II, Part D, Table 4. No IPEC internals components operate at > 700°F. Therefore, loss of preload due to stress relaxation (creep) is not an applicable aging effect for the reactor vessel internals components. Nevertheless, loss of preload of stainless steel and nickel alloy reactor vessel internals components will be managed to the extent that industry developed reactor vessel internals aging management programs address these aging effects. The IPEC commitment to these RVI programs is included in UFSAR Supplement, Appendix A, Sections A.2.1.41 and A.3.1.41.

#### 3.1.2.2.10 Loss of Material due to Erosion

Loss of material due to erosion could occur in steel steam generator feedwater impingement plates and supports exposed to secondary feedwater. The IPEC steam generator design does not employ a feedwater impingement plate. This item is not applicable to IPEC.

#### 3.1.2.2.11 Cracking due to Flow-Induced Vibration

This paragraph in NUREG-1800 applies to BWRs only.

#### 3.1.2.2.12 Cracking due to Stress Corrosion Cracking and Irradiation-Assisted Stress Corrosion Cracking (IASCC)

Cracking due to SCC and IASCC could occur in PWR stainless steel reactor internals exposed to reactor coolant. To manage cracking in vessel internals components, IPEC maintains the Water Chemistry Control – Primary and Secondary Program and will (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, submit an inspection plan for reactor internals to the NRC for review and approval. The IPEC commitment to these RVI programs is included in UFSAR Supplement, Appendix A, Sections A.2.1.41 and A.3.1.41.

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

Cracking due to PWSCC in most components made of nickel alloy is managed by the Water Chemistry Control – Primary and Secondary, Inservice Inspection, and Nickel Alloy Inspection Programs. The Nickel Alloy Inspection Program implements the applicable NRC Orders and will implement applicable (1) Bulletins and Generic Letters and (2) staff-accepted industry guidelines. UFSAR Supplement, Appendix A, Sections A.2.1.20 and A.3.1.20 provide a commitment for this program.

#### 3.1.2.2.14 Wall Thinning due to Flow-Accelerated Corrosion

Wall thinning due to flow-accelerated corrosion could occur in steel feedwater inlet rings and supports. The Steam Generator Integrity Program manages loss of material due to flow-accelerated corrosion in the feedwater inlet ring using periodic visual inspections.

#### 3.1.2.2.15 Changes in Dimensions due to Void Swelling

Changes in dimensions due to void swelling could occur in stainless steel and nickel alloy reactor internal components exposed to reactor coolant. To manage changes in dimensions of vessel internals components, IPEC will (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, submit an inspection plan for reactor internals to the NRC for review and approval. This commitment is included in the UFSAR Supplement, Appendix A, Sections A.2.1.41 and A.3.1.41.

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

1. Cracking due to SCC in stainless steel control rod drive head penetration components and on the primary coolant side of steel steam generator heads clad with stainless steel is managed by the Water Chemistry Control – Primary and Secondary and Inservice Inspection Programs. Cracking of nickel alloy control rod drive head penetration components due to PWSCC is managed by the Water Chemistry Control – Primary and Secondary, Inservice Inspection and Reactor Vessel Head Penetration Inspection Programs. The Reactor Vessel Head Penetration Inspection Program implements the applicable NRC Orders and will implement applicable (1) Bulletins and Generic Letters and (2) staff-accepted industry guidelines. UFSAR Supplement, Appendix A, Sections A.2.1.30 and A.3.1.30 provide a commitment for this program. For the steam generator tubesheets, cracking is managed by the Water Chemistry Control – Primary and Secondary and Steam Generator Integrity Programs.

2. Cracking due to SCC could occur on stainless steel pressurizer spray heads and cracking due to PWSCC could occur on nickel-alloy pressurizer spray heads. The IPEC pressurizer spray heads are composed of cast austenitic stainless steel. Management of cracking of these components is discussed in Section 3.1.2.2.7 item 2.

### 3.1.2.2.17 Cracking due to Stress Corrosion Cracking, Primary Water Stress Corrosion Cracking, and Irradiation-Assisted Stress Corrosion Cracking

Cracking due to stress corrosion cracking (SCC), primary water stress corrosion cracking (PWSCC), and irradiation-assisted stress corrosion cracking (IASCC) could occur in PWR stainless steel and nickel alloy reactor vessel internals components. To manage cracking in vessel internals components, IPEC maintains the Water Chemistry Control – Primary and Secondary Program and will (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, submit an inspection plan for reactor internals to the NRC for review and approval. The IPEC commitment to these RVI programs is included in UFSAR Supplement, Appendix A, Sections A.2.1.41 and A.3.1.41.

#### 3.1.2.2.18 Quality Assurance for Aging Management of Nonsafety-Related Components

See Appendix B Section B.0.3 for discussion of IPEC quality assurance procedures and administrative controls for aging management programs.

### 3.1.2.3 Time-Limited Aging Analyses

TLAA identified for the reactor coolant system include reactor vessel neutron embrittlement and metal fatigue. These topics are addressed in Section 4.

## 3.1.3 Conclusion

The reactor vessel, internals, reactor coolant system and steam generator components that are subject to aging management review have been identified in accordance with the requirements of 10 CFR 54.21. The aging management programs selected to manage the effects for the reactor vessel, internals, reactor coolant system and steam generator components are identified in Section 3.1.2.1 and in the following tables. A description of these aging management programs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation.

Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the reactor coolant system components will be managed such that there is reasonable assurance that the intended functions will be maintained consistent with the current licensing basis during the period of extended operation.

## Table 3.1.1
## Summary of Aging Management Programs for the Reactor Coolant System Evaluated in Chapter IV of NUREG-1801

**Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.1.1-1 | Steel pressure vessel support skirt and attachment welds | Cumulative fatigue damage | TLAA, evaluated in accordance with 10 CFR 54.21(c) | Yes, TLAA | Not applicable. The IPEC reactor vessel designs do not use a support skirt.<br>See Section 3.1.2.2.1 |
| 3.1.1-2 | BWR only | | | | |
| 3.1.1-3 | BWR only | | | | |
| 3.1.1-4 | BWR only | | | | |
| 3.1.1-5 | 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 is a TLAA.<br>See Section 3.1.2.2.1. |
| 3.1.1-6 | 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 | Fatigue is a TLAA.<br>See Section 3.1.2.2.1. |

**Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.1.1-7 | 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 is a TLAA.<br>See Section 3.1.2.2.1. |
| 3.1.1-8 | 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 is a TLAA.<br>See Section 3.1.2.2.1. |

**Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.1.1-9 | 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 is a TLAA.<br>See Section 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 is a TLAA.<br>See Section 3.1.2.2.1. |
| 3.1.1-11 | BWR only | | | | |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Consistent with NUREG-1801. The loss of material in steel steam generator components exposed to secondary feedwater and steam is managed by the Water Chemistry Control – Primary and Secondary Program. The One-Time Inspection Program will be used to verify the effectiveness of the water chemistry program.<br>See Section 3.1.2.2.2 item 1. |
| 3.1.1-13 | BWR only | | | | |
| 3.1.1-14 | BWR only | | | | |
| 3.1.1-15 | BWR only | | | | |
| 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), and Water Chemistry 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, detection of aging effects is to be evaluated | The Inservice Inspection and Water Chemistry Control – Primary and Secondary Programs manage loss of material for the steam generator steel shell exposed to secondary feedwater and steam. The IPEC steam generators are Model 44F which do not have a high-stress region at the shell to transition cone weld.<br>See Section 3.1.2.2.2 item 4. |

| **Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1** | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 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 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 | Loss of fracture toughness for the reactor vessel beltline shell and welds is a TLAA. The nozzles are not controlling for the TLAA evaluations.<br>See Section 3.1.2.2.3 item 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 | Yes, plant specific | Consistent with NUREG-1801. The Reactor Vessel Surveillance Program manages reduction in fracture toughness of reactor vessel beltline materials.<br>See Section 3.1.2.2.3 item 2. |
| 3.1.1-19 | BWR only | | | | |
| 3.1.1-20 | BWR only | | | | |
| 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 | Not applicable. SA508-Cl 2 forgings clad with stainless steel using a high-heat input welding process were not used in the IP2 or IP3 vessels.<br>See Section 3.1.2.2.5. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 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. | No, but licensee commitment to be confirmed | Consistent with NUREG-1801. Loss of fracture toughness of stainless steel and nickel alloy reactor vessel internals components will be managed by RVI aging management programs. The commitment to these RVI programs is included in UFSAR Supplement, Appendix A, Sections A.2.1.41 and A.3.1.41.<br>See Section 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, plant specific | Cracking of stainless steel bottom-mounted instrument guide tube components is managed by the Water Chemistry Control – Primary and Secondary and Inservice Inspection Programs. The reactor vessel closure head flange leak detection line is composed of nickel alloy and is addressed in line 3.1.1-31.<br>See Section 3.1.2.2.7 item 1. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | 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 and, for CASS components that do not meet the NUREG-0313 guidelines, a plant specific aging management program | Yes, plant specific | Cracking of cast austenitic stainless steel components exposed to reactor coolant is managed by the Water Chemistry Control – Primary and Secondary and Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Programs. These programs are supplemented by the Inservice Inspection Program for some components.<br>See Section 3.1.2.2.7 item 2. |
| 3.1.1-25 | BWR only | | | | |
| 3.1.1-26 | BWR only | | | | |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | 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. | No, but licensee commitment to be confirmed | Loss of preload due to stress relaxation (creep) is a concern for applications at temperatures higher than those of IPEC reactor vessel and internals components. Therefore, loss of preload due to stress relaxation (creep) is not an applicable aging effect for the reactor vessel internals components. Nevertheless, loss of preload of stainless steel and nickel alloy reactor vessel internals components will be managed consistent with industry developed reactor vessel internals aging management programs The commitment to these RVI programs is included in UFSAR Supplement, Appendix A, Sections A.2.1.41 and A.3.1.41.<br>See Section 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, plant specific | Not applicable. The IPEC steam generator design does not employ a feedwater impingement plate.<br>See Section 3.1.2.2.10. |
| 3.1.1-29 | BWR only | | | | |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | 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 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. | No, but licensee commitment needs to be confirmed | Consistent with NUREG-1801. Cracking of stainless steel reactor vessel internals components will be managed by the Water Chemistry Control – Primary and Secondary Program and by other RVI aging management programs. The commitment to these other RVI programs is included in UFSAR Supplement, Appendix A, Sections A.2.1.41 and A.3.1.41.<br>See Section 3.1.2.2.12. |

**Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | 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) and Water Chemistry and FSAR supp commitment to implement applicable plant commitments to (1) NRC Orders, Bulletins, and Generic Letters associated with nickel alloys and (2) staff-accepted industry guidelines. | No, but licensee commitment needs to be confirmed | Cracking of nickel alloy components will be managed by the Water Chemistry Control – Primary and Secondary, Inservice Inspection and Nickel Alloy Inspection Programs.<br>See Section 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, plant specific | The Steam Generator Integrity Program manages loss of material due to flow accelerated corrosion in the feedwater inlet ring.<br>See Section 3.1.2.2.14. |

**Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | 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. | No, but licensee commitment to be confirmed | Consistent with NUREG-1801. Changes in dimensions of stainless steel and nickel alloy reactor vessel internals components will be managed by RVI aging management programs. The commitment to these RVI programs is included in UFSAR Supplement, Appendix A, Sections A.2.1.41 and A.3.1.41.<br>See Section 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) and Water Chemistry and for nickel alloy, FSAR supplement commitment to implement applicable plant commitments to (1) NRC Orders, Bulletins and Generic Letters associated with nickel alloys and (2) staff accepted industry guidelines. | No, but licensee commitment needs to be confirmed | Cracking of stainless steel control rod drive head penetration components is managed by the Water Chemistry Control – Primary and Secondary and Inservice Inspection Programs. Cracking of nickel alloy control rod drive head penetration components is managed by the Water Chemistry Control – Primary and Secondary, Inservice Inspection and Reactor Vessel Head Penetration Inspection Programs.<br>See Section 3.1.2.2.16 item 1. |

| **Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1** | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **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) and Water Chemistry and for nickel alloy, FSAR supplement commitment to implement applicable plant commitments to (1) NRC Orders, Bulletins and Generic Letters associated with nickel alloys and (2) staff accepted industry guidelines | No, but licensee commitment needs to be confirmed | The corresponding NUREG-1801 line applies to once-through steam generators. It was used as a comparison for the steam generator channel heads and tubesheets. Cracking of the steel with stainless steel clad channel heads is managed by the Water Chemistry Control – Primary and Secondary and Inservice Inspection Programs. For the steel with nickel alloy clad steam generator tubesheets, cracking is managed by the Water Chemistry Control – Primary and Secondary and Steam Generator Integrity Programs.<br>See Section 3.1.2.2.16 item 1. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 and One-Time Inspection and, for nickel alloy welded spray heads, provide commitment in FSAR supplement to submit AMP delineating commitments to Orders, Bulletins, or Generic Letters that inspect stipulated components for cracking of wetted surfaces. | No, unless licensee commitment needs to be confirmed | This line was not used. The pressurizer spray heads are composed of CASS. Cracking of these components is addressed in line 3.1.1-24.<br>See Section 3.1.2.2.16 item 2. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | 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 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. | No, but licensee commitment needs to be confirmed | Consistent with NUREG-1801. Cracking of stainless steel and nickel alloy reactor vessel internals components will be managed by the Water Chemistry Control – Primary and Secondary Program and by other RVI aging management programs. The commitment to these other RVI programs is included in UFSAR Supplement, Appendix A, Sections A.2.1.41 and A.3.1.41.<br>See Section 3.1.2.2.17. |
| 3.1.1-38 | BWR only | | | | |
| 3.1.1-39 | BWR only | | | | |
| 3.1.1-40 | BWR only | | | | |
| 3.1.1-41 | BWR only | | | | |
| 3.1.1-42 | BWR only | | | | |
| 3.1.1-43 | BWR only | | | | |
| 3.1.1-44 | BWR only | | | | |
| 3.1.1-45 | BWR only | | | | |
| 3.1.1-46 | BWR only | | | | |

| **Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1** | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 3.1.1-47 | BWR only | | | | |
| 3.1.1-48 | BWR only | | | | |
| 3.1.1-49 | BWR only | | | | |
| 3.1.1-50 | BWR only | | | | |
| 3.1.1-51 | BWR only | | | | |

| **Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1** | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **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 | No | Not applicable.<br>High strength low alloy steel is not used for these bolting applications at IPEC. Applied stress for stainless steel closure bolting applications should be much less than 100 ksi. Consequently, cracking of bolting due to stress corrosion cracking is not an aging mechanism requiring management.<br>Industry operating experience indicates that loss of material due to wear is not a significant aging effect for this bolting. Occasional thread failures due to wear related mechanisms, such as galling, are event driven conditions that are resolved as required.<br>Loss of preload is a design driven effect and not an aging effect requiring management. Bolting at IPEC is standard grade B7 low alloy steel, or similar material, except in rare specialized applications such as where stainless steel bolting is utilized. Loss of preload due to stress relaxation (creep) would only be a concern in very high temperature applications (> 700°F) as stated in the ASME Code, Section II, Part D, Table 4.<br>(continued) |

| Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1 | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| | | | | | No IPEC bolting operates at > 700°F. Therefore, loss of preload due to stress relaxation (creep) is not an applicable aging effect for the reactor coolant system. Other issues that may result in pressure boundary joint leakage are improper design or maintenance issues. Improper bolting application (design) and maintenance issues are current plant operational concerns and not related to aging effects or mechanisms that require management during the period of extended operation. As described in the Bolting Integrity Program, IPEC has taken actions to address NUREG–1339, *Resolution to Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants*. These actions include implementation of good bolting practices in accordance with EPRI NP-5067, “Good Bolting Practices.” Proper joint preparation and make-up in accordance with industry standards is expected to preclude loss of preload. This has been confirmed by operating experience at IPEC. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 | No | Consistent with NUREG-1801. The Water Chemistry Control – Closed Cooling Water Program manages loss of material in steel components exposed to closed cycle cooling water. |
| 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 | No | Not applicable. There are no copper alloy components in the Class 1 reactor vessel, vessel internals or reactor coolant pressure boundary. |
| 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). 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 | The Inservice Inspection Program manages the reduction of fracture toughness in cast austenitic stainless steel components of the reactor coolant pressure boundary. |

| **Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1** | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 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 | No | Not applicable. There are no copper alloy components in the Class 1 reactor vessel, vessel internals or reactor coolant pressure boundary. |
| 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 | Consistent with NUREG-1801. The Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program will manage the reduction of fracture toughness in cast austenitic stainless steel components. |
| 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 | No | Consistent with NUREG-1801. The Boric Acid Corrosion Prevention Program manages loss of material of external surfaces of steel components exposed to air with borated water leakage. |
| 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 | No | The steam outlet nozzle contains a nickel alloy flow restrictor and the feedwater nozzle contains a nickel alloy thermal sleeve that isolate the carbon steel nozzles from high fluid velocities; therefore these components are not susceptible to FAC. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.1.1-60 | Stainless steel flux thimble tubes (with or without chrome plating) | Loss of material due to wear | Flux Thimble Tube Inspection | No | Consistent with NUREG-1801. The Flux Thimble Tube Inspection Program will manage loss of material due to wear in the flux thimble tubes. |
| 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) | No | The Inservice Inspection Program manages cracking of the steel pressurizer support skirt. |
| 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) | No | This line was not used. Cracking due to cyclic loading is addressed in other items as cracking due to fatigue. Nevertheless, the Inservice Inspection Program manages cracking of stainless steel piping > 4” nps. |

| Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1 | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **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) | No | The Inservice Inspection Program manages loss of material due to wear of the steel reactor vessel flange and stainless steel and nickel alloy reactor vessel internals components. |
| 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) and Water Chemistry | No | The Inservice Inspection and Water Chemistry Control – Primary and Secondary Programs manage cracking in steel with stainless steel or nickel alloy clad components. Cracking of stainless steel components is addressed in other lines. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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) and Water Chemistry and Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors | No | The Water Chemistry Control – Primary and Secondary and Nickel Alloy Inspection Programs manage cracking of nickel alloy reactor vessel upper head penetrations and nozzles. |
| 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 | No | This line was not used. Erosion at manways and handholes is the result of damage from leaking joints that have not been corrected. At IPEC leaks are fixed as soon as practical. If damage due to erosion has occurred, it would also be repaired. |
| 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), and Water Chemistry | No | The Water Chemistry Control – Primary and Secondary and Inservice Inspection Programs manage cracking in the steel with stainless steel clad pressurizer heads and shell. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | 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), and Water Chemistry | No | The Water Chemistry Control – Primary and Secondary and Inservice Inspection Programs manage cracking in most stainless steel and steel with stainless steel clad Class 1 components. For some components not subject to the Inservice Inspection Program, the Water Chemistry Control – Primary and Secondary Program manages cracking. The pressurizer spray head coupling and locking bar supports flow distribution within the pressurizer and are not part of the pressure boundary. The One-Time Inspection Program will be used to verify the effectiveness of the water chemistry program. |
| 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), and Water Chemistry | No | The Water Chemistry Control – Primary and Secondary and Inservice Inspection Programs manage cracking in stainless steel nozzles and penetrations. Nickel alloy used for such applications is compared to other lines. |
| 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), Water chemistry, and One-Time Inspection of ASME Code Class 1 Small-bore Piping | No | The Water Chemistry Control – Primary and Secondary, One-Time Inspection – Small Bore Piping and Inservice Inspection Programs manage cracking in stainless steel and steel with stainless steel clad Class 1 components < 4” nps. |

| **Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1** | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 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 | No | Consistent with NUREG-1801. The Reactor Head Closure Studs Program manages loss of material and cracking of the steel closure head stud assemblies. |
| 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 and Water Chemistry | No | Consistent with NUREG-1801. The Water Chemistry Control – Primary and Secondary and Steam Generator Integrity Programs manage cracking and loss of material due to wear of the nickel alloy steam generator tubes exposed to secondary feedwater and steam. |
| 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 and Water Chemistry | No | Consistent with NUREG-1801. The Water Chemistry Control – Primary and Secondary and Steam Generator Integrity Programs manage cracking of nickel alloy steam generator tubes and tube plugs exposed to reactor coolant. |

| **Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1** | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 3.1.1-74 | Chrome plated steel, stainless steel, nickel alloy steam generator antivibration 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 and Water Chemistry | No | Consistent with NUREG-1801 for some components. The Water Chemistry Control – Primary and Secondary and Steam Generator Integrity Programs manage cracking and loss of material of stainless steel and nickel alloy steam generator components exposed to secondary feedwater and steam. For some components, loss of material is managed by the Water Chemistry Control – Primary and Secondary Program. The One-Time Inspection Program will be used to verify the effectiveness of the water chemistry program. |
| 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 and Water Chemistry | No | Not applicable. This line applies to once through steam generators. IP2 and IP3 use recirculating steam generators. |
| 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 and Water Chemistry | No | Consistent with NUREG-1801. The Water Chemistry Control – Primary and Secondary and Steam Generator Integrity Programs manage loss of material of steel steam generator components exposed to secondary feedwater and steam. |

| Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1 | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **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 and Water Chemistry | No | Not applicable. IPEC steam generator components are not exposed to phosphate chemistry in secondary feedwater or steam. |
| 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 and Water Chemistry | No | Not applicable. The IPEC steam generator design does not employ tube support lattice bars. |
| 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; Water Chemistry 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 | Not applicable. The IPEC steam generator design uses stainless steel tube support plates. |

| Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1 | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 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 | Consistent with NUREG-1801. The Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program will manage loss of fracture toughness of cast austenitic stainless steel vessel internals components exposed to reactor coolant and high neutron fluence. |
| 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 | No | Consistent with NUREG-1801. TheWater Chemistry Control – Primary and Secondary Program manages cracking of the nickel-alloy steam generator divider plate exposed to reactor coolant. The Water Chemistry Control – Primary and Secondary Program also manages cracking of the primary nozzle closure rings which form a temporary pressure boundary (nozzle dam) during outages. |
| 3.1.1-82 | Stainless steel steam generator primary side divider plate exposed to reactor coolant | Cracking due to stress corrosion cracking | Water Chemistry | No | Not applicable. The steam generator primary side divider plate is composed of nickel alloy. |

| **Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1** | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 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 | No | Consistent with NUREG-1801. The Water Chemistry Control – Primary and Secondary Program manages loss of material of stainless steel; steel with nickel-alloy or stainless steel cladding; and nickel-alloy components exposed to reactor coolant. The Steam Generator Integrity Program supplements water chemistry for steam generator tubes. |
| 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 and One-Time Inspection or Inservice Inspection (IWB, IWC, and IWD). | No | The Water Chemistry Control – Primary and Secondary Program manages cracking in one nickel alloy steam generator component exposed to secondary feedwater or steam. The One-Time Inspection Program will be used to verify the effectiveness of the water chemistry program. |
| 3.1.1-85 | Nickel alloy piping, piping components, and piping elements exposed to air – indoor uncontrolled (external) | None | None | NA - No AEM or AMP | Consistent with NUREG-1801. |

| **Table 3.1.1: Reactor Coolant System, NUREG-1801 Vol. 1** | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **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 - No AEM or AMP | Consistent with NUREG-1801. |
| 3.1.1-87 | Steel piping, piping components, and piping elements in concrete | None | None | NA - No AEM or AMP | Not applicable. There are no components of the Class 1 reactor vessel, vessel internals or reactor coolant pressure boundary exposed to concrete. |

## Notes for Tables 3.1.2-1-IP2 through 3.1.2-4-IP3

### Generic Notes

A. Consistent with NUREG-1801 item for component, material, environment, aging effect and aging management program. AMP is consistent with NUREG-1801 AMP.

B. Consistent with NUREG-1801 item for component, material, environment, aging effect and aging management program. AMP has exceptions to NUREG-1801 AMP.

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

D. Component is different, but consistent with NUREG-1801 item for material, environment, aging effect and aging management program. AMP has exceptions to NUREG-1801 AMP.

E. Consistent with NUREG-1801 material, environment, and aging effect but a different aging management program is credited.

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.

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

J. Neither the component nor the material and environment combination is evaluated in NUREG-1801.

### Plant-Specific Notes

101. NUREG-1801, Section XI.M16 states: "No further aging management review is necessary if the applicant provides a commitment in the FSAR supplement to (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, submit an inspection plan for reactor internals to the NRC for review and approval." IPEC commitment can be found in Appendix A (UFSAR supplement) of the license renewal application.

102. This item is considered a match to NUREG-1801 even though the environments are different because the aging effect of cracking due to fatigue is independent of the environment.

103. These components are subject to cracking due to fatigue as identified in the generic entry in the first line of this table.

104. The One-Time Inspection Program will verify effectiveness of the Water Chemistry Control – Primary and Secondary Program.

# Table 3.1.2-1-IP2
# Reactor Vessel
# Summary of Aging Management Review

**Table 3.1.2-1-IP2: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Reactor vessel components | Pressure boundary | Carbon steel, stainless steel, nickel alloy, carbon steel with stainless steel or nickel alloy cladding | Treated borated water (int) | Cracking – fatigue | TLAA – metal fatigue | IV.A2-21<br>(R-219) | 3.1.1-9 | A |
| Reactor vessel components<br>• stud assembly | Pressure boundary | Carbon steel | Air – indoor (ext) | Cracking – fatigue | TLAA – metal fatigue | IV.A2-4<br>(R-73) | 3.1.1-7 | A |

**Table 3.1.2-1-IP2: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bottom-mounted instrumentation<br>• guide tubes | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-1<br>(RP-13) | 3.1.1-23 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |
| Bottom-mounted instrumentation<br>• flux thimble tube<br>• bullet plug | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | C |
| | | | | Loss of material – wear | Flux Thimble Tube Inspection | IV.B2-13<br>(R-145) | 3.1.1-60 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-1<br>(RP-13) | 3.1.1-23 | E |

**Table 3.1.2-1-IP2: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bottom-mounted instrumentation<br>• seal table | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-1<br>(RP-13) | 3.1.1-23 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |
| Closure head<br>• closure head | Pressure boundary | Carbon steel with stainless steel cladding | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-19<br>(R-25) | 3.1.1-64 | E |
| | | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |

**Table 3.1.2-1-IP2: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Closure head<br>• flange | Pressure boundary<br>Structural support | Carbon steel with stainless steel cladding | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Loss of material – wear | Inservice Inspection | IV.A2-25<br>(R-87) | 3.1.1-63 | E |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-19<br>(R-25) | 3.1.1-64 | E |
| | | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |
| Closure head<br>• studs<br>• nuts<br>• washers | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |
| | | | | Loss of material – wear | Reactor Head Closure Studs | IV.A2-3<br>(R-72) | 3.1.1-71 | A |
| | | | | Cracking | Reactor Head Closure Studs | IV.A2-2<br>(R-71) | 3.1.1-71 | A |

**Table 3.1.2-1-IP2: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Control rod drive head penetration<br>• CETNA | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-11<br>(R-76) | 3.1.1-34 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |
| Control rod drive head penetration<br>• housing adapter flange | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-11<br>(R-76) | 3.1.1-34 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |

**Table 3.1.2-1-IP2: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Control rod drive head penetration<br>• housing tube (nozzle) | Pressure boundary | Nickel alloy | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection<br>Reactor Vessel Head Penetration Inspection | IV.A2-11<br>(R-76) | 3.1.1-34 | E |
| | | | Air – indoor (ext) | None | None | IV.E-1<br>(RP-03) | 3.1.1-85 | C |
| Control rod drive head penetration<br>• pressure housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-11<br>(R-76) | 3.1.1-34 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |

**Table 3.1.2-1-IP2: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Control rod drive head penetration<br>• pressure housing cap (latch housing) | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-11<br>(R-76) | 3.1.1-34 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |
| Nozzles<br>• inlet / outlet<br>• closure head vent | Pressure boundary | Carbon steel with stainless steel cladding | Treated borated water > 140°F (int) | Loss of material (cladding) | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-19<br>(R-25) | 3.1.1-64 | E |
| | | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |

**Table 3.1.2-1-IP2: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Nozzle safe ends and welds<br>• inlet / outlet safe ends | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-15<br>(R-83) | 3.1.1-69 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |
| Nozzle safe ends and welds<br>• inlet / outlet safe end welds | Pressure boundary | Nickel alloy | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Nickel Alloy Inspection | IV.A2-18<br>(R-90) | 3.1.1-65 | E |
| | | | Air – indoor (ext) | None | None | IV.E-1<br>(RP-03) | 3.1.1-85 | C |

**Table 3.1.2-1-IP2: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Nozzle safe ends and welds<br>• closure head vent | Pressure boundary | Nickel alloy | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Nickel Alloy Inspection | IV.A2-18<br>(R-90) | 3.1.1-65 | E |
| | | | Air – indoor (ext) | None | None | IV.E-1<br>(RP-03) | 3.1.1-85 | C |
| Penetrations<br>• bottom head instrument tubes | Pressure boundary | Nickel alloy | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection<br>Nickel Alloy Inspection | IV.A2-19<br>(R-89) | 3.1.1-31 | E |
| | | | Air – indoor (ext) | None | None | IV.E-1<br>(RP-03) | 3.1.1-85 | A |

**Table 3.1.2-1-IP2: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Penetrations<br>• bottom head safe ends and welds | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-15<br>(R-83) | 3.1.1-69 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |
| Vessel external attachments<br>• lifting lugs | Structural support | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |
| Vessel external attachments<br>• vessel support pads | Structural support | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |
| Vessel external attachments<br>• refueling seal support ring | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |

**Table 3.1.2-1-IP2: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Vessel internal attachments<br>• core support lugs (pads) | Structural support | Nickel alloy | Treated borated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Nickel Alloy Inspection | IV.A2-12<br>(R-88) | 3.1.1-31 | E |
| Vessel shell<br>• bottom head | Pressure boundary | Carbon steel with stainless steel cladding | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-19<br>(R-25) | 3.1.1-64 | E |
| | | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |

**Table 3.1.2-1-IP2: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Vessel shell<br>• upper<br>• intermediate (including beltline welds)<br>• lower (including beltline welds) | Pressure boundary | Carbon steel with stainless steel or nickel alloy cladding | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-19<br>(R-25) | 3.1.1-64 | E |
| | | | Treated borated water > 140°F (int)<br>Neutron fluence | Reduction of fracture toughness | TLAA – neutron fluence<br>Reactor Vessel Surveillance | IV.A2-23<br>(R-84)<br>IV.A2-24<br>(R-86) | 3.1.1-17<br>3.1.1-18 | A<br>B |
| | | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |

**Table 3.1.2-1-IP2: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Vessel shell<br>• vessel flange | Pressure boundary | Carbon steel with stainless steel cladding | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Loss of material – wear | Inservice Inspection | IV.A2-25<br>(R-87) | 3.1.1-63 | E |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-19<br>(R-25) | 3.1.1-64 | E |
| | | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |

# Table 3.1.2-1-IP3
# Reactor Vessel
# Summary of Aging Management Review

**Table 3.1.2-1-IP3: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Reactor vessel components | Pressure boundary | Carbon steel, stainless steel, nickel alloy, carbon steel with stainless steel or nickel alloy cladding | Treated borated water (int) | Cracking – fatigue | TLAA – metal fatigue | IV.A2-21<br>(R-219) | 3.1.1-9 | A |
| Reactor vessel components<br>• stud assembly | Pressure boundary | Carbon steel | Air – indoor (ext) | Cracking – fatigue | TLAA – metal fatigue | IV.A2-4<br>(R-73) | 3.1.1-7 | A |

**Table 3.1.2-1-IP3: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bottom-mounted instrumentation<br>• guide tubes | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-1<br>(RP-13) | 3.1.1-23 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |
| Bottom-mounted instrumentation<br>• flux thimble tube<br>• bullet plug | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | C |
| | | | | Loss of material – wear | Flux Thimble Tube Inspection | IV.B2-13<br>(R-145) | 3.1.1-60 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-1<br>(RP-13) | 3.1.1-23 | E |

| **Table 3.1.2-1-IP3: Reactor Vessel** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Bottom-mounted instrumentation<br>• seal table | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-1<br>(RP-13) | 3.1.1-23 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |
| Closure head<br>• closure head | Pressure boundary | Carbon steel with stainless steel cladding | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-19<br>(R-25) | 3.1.1-64 | E |
| | | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |

**Table 3.1.2-1-IP3: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Closure head<br>• flange | Pressure boundary<br>Structural support | Carbon steel with stainless steel cladding | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Loss of material – wear | Inservice Inspection | IV.A2-25<br>(R-87) | 3.1.1-63 | E |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-19<br>(R-25) | 3.1.1-64 | E |
| | | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |
| Closure head<br>• studs<br>• nuts<br>• washers | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |
| | | | | Loss of material – wear | Reactor Head Closure Studs | IV.A2-3<br>(R-72) | 3.1.1-71 | A |
| | | | | Cracking | Reactor Head Closure Studs | IV.A2-2<br>(R-71) | 3.1.1-71 | A |

**Table 3.1.2-1-IP3: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Control rod drive head penetration<br>• CETNA | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-11<br>(R-76) | 3.1.1-34 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |
| Control rod drive head penetration<br>• housing adapter flange | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-11<br>(R-76) | 3.1.1-34 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |

**Table 3.1.2-1-IP3: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Control rod drive head penetration<br>• housing tube (nozzle) | Pressure boundary | Nickel alloy | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection<br>Reactor Vessel Head Penetration Inspection | IV.A2-11<br>(R-76) | 3.1.1-34 | E |
| | | | Air – indoor (ext) | None | None | IV.E-1<br>(RP-03) | 3.1.1-85 | C |
| Control rod drive head penetration<br>• pressure housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-11<br>(R-76) | 3.1.1-34 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |

| **Table 3.1.2-1-IP3: Reactor Vessel** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Control rod drive head penetration<br>• pressure housing cap (latch housing) | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-11<br>(R-76) | 3.1.1-34 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |
| Nozzles<br>• inlet / outlet<br>• closure head vent | Pressure boundary | Carbon steel with stainless steel cladding | Treated borated water > 140°F (int) | Loss of material (cladding) | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-19<br>(R-25) | 3.1.1-64 | E |
| | | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |

| **Table 3.1.2-1-IP3: Reactor Vessel** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Nozzle safe ends and welds<br>• inlet / outlet safe ends | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-15<br>(R-83) | 3.1.1-69 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |
| Nozzle safe ends and welds<br>• inlet / outlet safe end welds | Pressure boundary | Nickel alloy | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Nickel Alloy Inspection | IV.A2-18<br>(R-90) | 3.1.1-65 | E |
| | | | Air – indoor (ext) | None | None | IV.E-1<br>(RP-03) | 3.1.1-85 | C |

| **Table 3.1.2-1-IP3: Reactor Vessel** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Nozzle safe ends and welds<br>• closure head vent | Pressure boundary | Nickel alloy | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Nickel Alloy Inspection | IV.A2-18<br>(R-90) | 3.1.1-65 | E |
| | | | Air – indoor (ext) | None | None | IV.E-1<br>(RP-03) | 3.1.1-85 | C |
| Penetrations<br>• bottom head instrument tubes | Pressure boundary | Nickel alloy | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection<br>Nickel Alloy Inspection | IV.A2-19<br>(R-89) | 3.1.1-31 | E |
| | | | Air – indoor (ext) | None | None | IV.E-1<br>(RP-03) | 3.1.1-85 | A |

**Table 3.1.2-1-IP3: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Penetrations<br>• bottom head safe ends and welds | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.A2-15<br>(R-83) | 3.1.1-69 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |
| Vessel external attachments<br>• lifting lugs | Structural support | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |
| Vessel external attachments<br>• vessel support pads | Structural support | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |
| Vessel external attachments<br>• refueling seal support ring | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |

**Table 3.1.2-1-IP3: Reactor Vessel**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Vessel internal attachments<br>• core support lugs (pads) | Structural support | Nickel alloy | Treated borated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Nickel Alloy Inspection | IV.A2-12<br>(R-88) | 3.1.1-31 | E |
| Vessel shell<br>• bottom head | Pressure boundary | Carbon steel with stainless steel cladding | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-19<br>(R-25) | 3.1.1-64 | E |
| | | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |

| **Table 3.1.2-1-IP3: Reactor Vessel** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Vessel shell<br>• upper<br>• intermediate (including beltline welds)<br>• lower (including beltline welds) | Pressure boundary | Carbon steel with stainless steel or nickel alloy cladding | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-19<br>(R-25) | 3.1.1-64 | E |
| | | | Treated borated water > 140°F (int)<br>Neutron fluence | Reduction of fracture toughness | TLAA – neutron fluence<br>Reactor Vessel Surveillance | IV.A2-23<br>(R-84)<br>IV.A2-24<br>(R-86) | 3.1.1-17<br>3.1.1-18 | A<br>A |
| | | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |

| **Table 3.1.2-1-IP3: Reactor Vessel** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Vessel shell<br>• vessel flange | Pressure boundary | Carbon steel with stainless steel cladding | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.A2-14<br>(RP-28) | 3.1.1-83 | A |
| | | | | Loss of material – wear | Inservice Inspection | IV.A2-25<br>(R-87) | 3.1.1-63 | E |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-19<br>(R-25) | 3.1.1-64 | E |
| | | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.A2-13<br>(R-17) | 3.1.1-58 | A |

# Table 3.1.2-2-IP2
# Reactor Vessel Internals
# Summary of Aging Management Review

| **Table 3.1.2-2-IP2: Reactor Vessel Internals** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Reactor vessel internals components | Structural support | Stainless steel, CASS, nickel alloy | Treated borated water | Cracking – fatigue | TLAA – metal fatigue | IV.B2-31<br>(R-53) | 3.1.1-5 | A |
| *Lower Core Support Structure* | | | | | | | | |
| Core baffle/ former assembly<br>• bolts | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-4<br>(R-126) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-10<br>(R-125) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of preload | RVI commitment | IV.B2-5<br>(R-129) | 3.1.1-27 | A, 101 |
| | | | Treated borated water > 140°F<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-6<br>(R-128) | 3.1.1-22 | A, 101 |

**Table 3.1.2-2-IP2: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Core baffle/ former assembly<br>• plates | Structural support<br>Flow distribution<br>Shielding | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-1<br>(R-124) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-2<br>(R-123) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-3<br>(R-127) | 3.1.1-22 | A, 101 |

**Table 3.1.2-2-IP2: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Core barrel assembly<br>• bolts and screws | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-4<br>(R-126) | 3.1.1-33 | C, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-10<br>(R-125) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of preload | RVI commitment | IV.B2-5<br>(R-129) | 3.1.1-27 | A, 101 |
| | | | Treated borated water > 140°F<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-6<br>(R-128) | 3.1.1-22 | A, 101 |

**Table 3.1.2-2-IP2: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Core barrel assembly<br>• axial flexure plates<br>• flange<br>• ring<br>• shell<br>• thermal shield | Structural support<br>Flow distribution<br>Shielding | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-7<br>(R-121) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-8<br>(R-120) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-9<br>(R-122) | 3.1.1-22 | A, 101 |
| Core barrel assembly<br>• outlet nozzles | Flow distribution | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-7<br>(R-121) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-8<br>(R-120) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |

**Table 3.1.2-2-IP2: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Lower internals assembly<br>• clevis insert bolt | Structural support | Nickel alloy | Treated borated water | Change in dimensions | RVI commitment | IV.B2-15<br>(R-134) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-16<br>(R-133) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of preload | RVI commitment | IV.B2-14<br>(R-137) | 3.1.1-27 | A, 101 |
| | | | Treated borated water<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-17<br>(R-135) | 3.1.1-22 | A, 101 |

| Table 3.1.2-2-IP2: Reactor Vessel Internals | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Lower internals assembly<br>• clevis insert | Structural support | Nickel alloy | Treated borated water | Change in dimensions | RVI commitment | IV.B2-19<br>(R-131) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-20<br>(R-130) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of material – wear | Inservice Inspection | IV.B2-26<br>(R-142) | 3.1.1-63 | E |
| Lower internals assembly<br>• intermediate diffuser plate | Flow distribution | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-19<br>(R-131) | 3.1.1-33 | C, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-20<br>(R-130) | 3.1.1-37 | C, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |

| **Table 3.1.2-2-IP2: Reactor Vessel Internals** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Lower internals assembly<br>• fuel alignment pin | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-15<br>(R-134) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-16<br>(R-133) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-17<br>(R-135) | 3.1.1-22 | A, 101 |

| Table 3.1.2-2-IP2: Reactor Vessel Internals | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Lower internals assembly<br>• lower core plate | Structural support<br>Flow distribution | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-19<br>(R-131) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-20<br>(R-130) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-18<br>(R-132) | 3.1.1-22 | A, 101 |

**Table 3.1.2-2-IP2: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Lower internals assembly<br>• lower core support castings<br>- column cap<br>- lower core support | Structural support<br>Flow distribution | CASS | Treated borated water > 482°F | Change in dimensions | RVI commitment | IV.B2-23<br>(R-139) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-24<br>(R-138) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | Treated borated water > 482°F<br>Neutron fluence | Reduction of fracture toughness | Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) | IV.B2-21<br>(R-140) | 3.1.1-80 | A |

| **Table 3.1.2-2-IP2: Reactor Vessel Internals** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Lower internals assembly<br>• lower core support plate column bolt | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-15<br>(R-134) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-16<br>(R-133) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of preload | RVI commitment | IV.B2-25<br>(R-136) | 3.1.1-27 | A, 101 |
| | | | Treated borated water > 140°F<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-17<br>(R-135) | 3.1.1-22 | A, 101 |

**Table 3.1.2-2-IP2: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Lower internals assembly<br>• lower core support plate column sleeves | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-23<br>(R-139) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-24<br>(R-138) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-22<br>(R-141) | 3.1.1-22 | A, 101 |
| Lower internals assembly<br>• radial key | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-19<br>(R-131) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-20<br>(R-130) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of material – wear | Inservice Inspection | IV.B2-26<br>(R-142) | 3.1.1-63 | E |

| **Table 3.1.2-2-IP2: Reactor Vessel Internals** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Lower internals assembly<br>• secondary core support | Structural support<br>Flow distribution | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-19<br>(R-131) | 3.1.1-33 | C, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-20<br>(R-130) | 3.1.1-37 | C, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| *Upper Core Support Structure - Upper Internals Assembly* | | | | | | | | |
| RCCA guide tube assembly<br>• bolt | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-27<br>(R-119) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-28<br>(R-118) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of preload | RVI commitment | IV.B2-38<br>(R-114) | 3.1.1-27 | C, 101 |

**Table 3.1.2-2-IP2: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| RCCA guide tube assembly<br>• guide tube | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-29<br>(R-117) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-30<br>(R-116) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| RCCA guide tube assembly<br>• support pin | Structural support | Nickel alloy | Treated borated water | Change in dimensions | RVI commitment | IV.B2-27<br>(R-119) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-28<br>(R-118) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |

**Table 3.1.2-2-IP2: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Core plate alignment pin | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-39<br>(R-113) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-40<br>(R-112) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of material – wear | Inservice Inspection | IV.B2-34<br>(R115) | 3.1.1-63 | E |
| Head / vessel alignment pin | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-41<br>(R-107) | 3.1.1-33 | C, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-42<br>(R-106) | 3.1.1-30 | C, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of material – wear | Inservice Inspection | IV.B2-34<br>(R115) | 3.1.1-63 | E |

**Table 3.1.2-2-IP2: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Hold-down spring | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-41<br>(R-107) | 3.1.1-33 | A, 101 |
|  |  |  |  | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-42<br>(R-106) | 3.1.1-30 | A, 101 |
|  |  |  |  | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
|  |  |  |  | Loss of preload | RVI commitment | IV.B2-38<br>(R-114) | 3.1.1-27 | A, 101 |

| **Table 3.1.2-2-IP2: Reactor Vessel Internals** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Mixing devices<br>• support column orifice base<br>• support column mixer | Structural support<br>Flow distribution | CASS | Treated borated water > 482°F | Change in dimensions | RVI commitment | IV.B2-35<br>(R-110) | 3.1.1-33 | C, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-36<br>(R-109) | 3.1.1-30 | C, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | Treated borated water > 482°F<br>Neutron fluence | Reduction of fracture toughness | Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) | IV.B2-37<br>(R-111) | 3.1.1-80 | A |
| Support column | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-35<br>(R-110) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-36<br>(R-109) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |

| Table 3.1.2-2-IP2: Reactor Vessel Internals | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Upper core plate, fuel alignment pin | Structural support<br>Flow distribution | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-39<br>(R-117) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-40<br>(R-112) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| Upper support plate, support assembly | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-41<br>(R-107) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-42<br>(R-106) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |

| **Table 3.1.2-2-IP2: Reactor Vessel Internals** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Upper support column bolt | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-39<br>(R-113 | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-40<br>(R-112) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of preload | RVI commitment | IV.B2-38<br>(R-114) | 3.1.1-27 | A, 101 |
| *Incore Instrumentation Support Structure* | | | | | | | | |
| Bottom mounted instrumentation column | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-11<br>(R-144) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-12<br>(R-143) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |

**Table 3.1.2-2-IP2: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flux thimble guide tube | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-11<br>(R-144) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-12<br>(R-143) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| Thermocouple conduit | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-11<br>(R-144) | 3.1.1-33 | C, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-12<br>(R-143) | 3.1.1-30 | C, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |

# Table 3.1.2-2-IP3
# Reactor Vessel Internals
# Summary of Aging Management Review

**Table 3.1.2-2-IP3: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Reactor vessel internals components | Structural support | Stainless steel, CASS, nickel alloy | Treated borated water | Cracking – fatigue | TLAA – metal fatigue | IV.B2-31<br>(R-53) | 3.1.1-5 | A |
| *Lower Core Support Structure* | | | | | | | | |
| Core baffle/ former assembly<br>• bolts | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-4<br>(R-126) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-10<br>(R-125) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of preload | RVI commitment | IV.B2-38<br>(R-114) | 3.1.1-27 | A, 101 |
| | | | Treated borated water > 140°F<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-6<br>(R-128) | 3.1.1-22 | A, 101 |

**Table 3.1.2-2-IP3: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Core baffle/ former assembly<br>• plates | Structural support<br>Flow distribution<br>Shielding | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-1<br>(R-124) | 3.1.1-33 | A, 101 |
|  |  |  |  | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-2<br>(R-123) | 3.1.1-30 | A, 101 |
|  |  |  |  | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
|  |  |  | Treated borated water > 140°F<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-3<br>(R-127) | 3.1.1-22 | A, 101 |

**Table 3.1.2-2-IP3: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Core barrel assembly<br>• bolts and screws | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-4<br>(R-126) | 3.1.1-33 | C, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-10<br>(R-125) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of preload | RVI commitment | IV.B2-38<br>(R-114) | 3.1.1-27 | A, 101 |
| | | | Treated borated water > 140°F<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-6<br>(R-128) | 3.1.1-22 | A, 101 |

| **Table 3.1.2-2-IP3: Reactor Vessel Internals** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Core barrel assembly<br>• axial flexure plates<br>• flange<br>• ring<br>• shell<br>• thermal shield | Structural support<br>Flow distribution<br>Shielding | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-7<br>(R-121) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-8<br>(R-120) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-9<br>(R-122) | 3.1.1-22 | A, 101 |
| Core barrel assembly<br>• outlet nozzles | Flow distribution | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-7<br>(R-121) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-8<br>(R-120) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |

| Table 3.1.2-2-IP3: Reactor Vessel Internals | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Lower internals assembly<br>• clevis insert bolt | Structural support | Nickel alloy | Treated borated water | Change in dimensions | RVI commitment | IV.B2-15<br>(R-134) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-16<br>(R-133) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of preload | RVI commitment | IV.B2-38<br>(R-114) | 3.1.1-27 | A, 101 |
| | | | Treated borated water<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-17<br>(R-135) | 3.1.1-22 | A, 101 |

**Table 3.1.2-2-IP3: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Lower internals assembly<br>• clevis insert | Structural support | Nickel alloy | Treated borated water | Change in dimensions | RVI commitment | IV.B2-19<br>(R-131) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-20<br>(R-130) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of material – wear | Inservice Inspection | IV.B2-26<br>(R-142) | 3.1.1-63 | E |
| Lower internals assembly<br>• intermediate diffuser plate | Flow distribution | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-19<br>(R-131) | 3.1.1-33 | C, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-20<br>(R-130) | 3.1.1-37 | C, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |

| Table 3.1.2-2-IP3: Reactor Vessel Internals | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Lower internals assembly<br>• fuel alignment pin | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-15<br>(R-134) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-16<br>(R-133) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-17<br>(R-135) | 3.1.1-22 | A, 101 |

**Table 3.1.2-2-IP3: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Lower internals assembly<br>• lower core plate | Structural support<br>Flow distribution | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-19<br>(R-131) | 3.1.1-33 | A, 101 |
|  |  |  |  | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-20<br>(R-130) | 3.1.1-37 | A, 101 |
|  |  |  |  | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
|  |  |  | Treated borated water > 140°F<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-18<br>(R-132) | 3.1.1-22 | A, 101 |

| Table 3.1.2-2-IP3: Reactor Vessel Internals | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Lower internals assembly<br>• lower core support castings<br>- column cap<br>- lower core support | Structural support<br>Flow distribution | CASS | Treated borated water > 482°F | Change in dimensions | RVI commitment | IV.B2-23<br>(R-139) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-24<br>(R-138) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | Treated borated water > 482°F<br>Neutron fluence | Reduction of fracture toughness | Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) | IV.B2-21<br>(R-140) | 3.1.1-80 | A |

**Table 3.1.2-2-IP3: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Lower internals assembly<br>• lower core support plate column bolt | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-15<br>(R-134) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-16<br>(R-133) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of preload | RVI commitment | IV.B2-38<br>(R-114) | 3.1.1-27 | A, 101 |
| | | | Treated borated water > 140°F<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-17<br>(R-135) | 3.1.1-22 | A, 101 |

**Table 3.1.2-2-IP3: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Lower internals assembly<br>• lower core support plate column sleeves | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-23<br>(R-139) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-24<br>(R-138) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F<br>Neutron fluence | Reduction of fracture toughness | RVI commitment | IV.B2-22<br>(R-141) | 3.1.1-22 | A, 101 |
| Lower internals assembly<br>• radial key | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-19<br>(R-131) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-20<br>(R-130) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of material – wear | Inservice Inspection | IV.B2-26<br>(R-142) | 3.1.1-63 | E |

**Table 3.1.2-2-IP3: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Lower internals assembly<br>• secondary core support | Structural support<br>Flow distribution | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-19<br>(R-131) | 3.1.1-33 | C, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-20<br>(R-130) | 3.1.1-37 | C, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| *Upper Core Support Structure - Upper Internals Assembly* | | | | | | | | |
| RCCA guide tube assembly<br>• bolt | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-27<br>(R-119) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-28<br>(R-118) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of preload | RVI commitment | IV.B2-38<br>(R-114) | 3.1.1-27 | C, 101 |

**Table 3.1.2-2-IP3: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| RCCA guide tube assembly<br>• guide tube | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-29<br>(R-117) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-30<br>(R-116) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| RCCA guide tube assembly<br>• support pin | Structural support | Nickel alloy | Treated borated water | Change in dimensions | RVI commitment | IV.B2-27<br>(R-119) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-28<br>(R-118) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |

| Table 3.1.2-2-IP3: Reactor Vessel Internals | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Core plate alignment pin | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-39<br>(R-113) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-40<br>(R-112) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of material – wear | Inservice Inspection | IV.B2-34<br>(R115) | 3.1.1-63 | E |
| Head / vessel alignment pin | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-41<br>(R-107) | 3.1.1-33 | C, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-42<br>(R-106) | 3.1.1-30 | C, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of material – wear | Inservice Inspection | IV.B2-34<br>(R115) | 3.1.1-63 | E |

**Table 3.1.2-2-IP3: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Hold-down spring | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-41<br>(R-107) | 3.1.1-33 | A, 101 |
|  |  |  |  | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-42<br>(R-106) | 3.1.1-30 | A, 101 |
|  |  |  |  | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
|  |  |  |  | Loss of preload | RVI commitment | IV.B2-38<br>(R-114) | 3.1.1-27 | A, 101 |

**Table 3.1.2-2-IP3: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Mixing devices<br>• support column orifice base<br>• support column mixer | Structural support<br>Flow distribution | CASS | Treated borated water > 482°F | Change in dimensions | RVI commitment | IV.B2-35<br>(R-110) | 3.1.1-33 | C, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-36<br>(R-109) | 3.1.1-30 | C, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | Treated borated water > 482°F<br>Neutron fluence | Reduction of fracture toughness | Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) | IV.B2-37<br>(R-111) | 3.1.1-80 | A |
| Support column | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-35<br>(R-110) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-36<br>(R-109) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |

**Table 3.1.2-2-IP3: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Upper core plate, fuel alignment pin | Structural support<br>Flow distribution | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-39<br>(R-117) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-40<br>(R-112) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| Upper support plate, support assembly | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-41<br>(R-107) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-42<br>(R-106) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |

| **Table 3.1.2-2-IP3: Reactor Vessel Internals** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Upper support column bolt | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-39<br>(R-113 | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-40<br>(R-112) | 3.1.1-37 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| | | | | Loss of preload | RVI commitment | IV.B2-38<br>(R-114) | 3.1.1-27 | A, 101 |
| *Incore Instrumentation Support Structure* | | | | | | | | |
| Bottom mounted instrumentation column | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-11<br>(R-144) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-12<br>(R-143) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |

**Table 3.1.2-2-IP3: Reactor Vessel Internals**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flux thimble guide tube | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-11<br>(R-144) | 3.1.1-33 | A, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-12<br>(R-143) | 3.1.1-30 | A, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |
| Thermocouple conduit | Structural support | Stainless steel | Treated borated water > 140°F | Change in dimensions | RVI commitment | IV.B2-11<br>(R-144) | 3.1.1-33 | C, 101 |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>RVI commitment | IV.B2-12<br>(R-143) | 3.1.1-30 | C, 101 |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.B2-32<br>(RP-24) | 3.1.1-83 | A |

# Table 3.1.2-3-IP2
# Reactor Coolant Pressure Boundary
# Summary of Aging Management Review

**Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Reactor coolant system components | Pressure boundary | Carbon steel, stainless steel | Air – indoor (ext) | Cracking – fatigue | TLAA – metal fatigue | IV.C2-10<br>(R-18) | 3.1.1-7 | A, 102 |
| Reactor coolant system pressure boundary components | Pressure boundary | Carbon steel, stainless steel, CASS, nickel alloy, carbon steel with stainless steel or nickel alloy cladding | Treated borated water (ext) | Cracking – fatigue | TLAA – metal fatigue | IV.C2-25<br>(R-223) | 3.1.1-8 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.1.1-58 | A |
| | | | | | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | C |
| | | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A, 103 |

| **Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Fittings (elbows, flanges, scoops, tees, etc.) | Pressure boundary | CASS | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)<br>Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-3<br>(R-05) | 3.1.1-24 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | | Reduction of fracture toughness | Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) | IV.C2-4<br>(R-52) | 3.1.1-57 | A |

**Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (bonnet) | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | VII.E1-5<br>(A-84) | 3.3.1-8 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

**Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.1.1-58 | A |
| | | | | | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | C |
| | | | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | IV.C2-14<br>(RP-10) | 3.1.1-53 | D |
| | | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | VII.E1-5<br>(A-84) | 3.3.1-8 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

| **Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water > 140°F (ext) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-5<br>(A-84) | 3.3.1-8 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-5<br>(A-84) | 3.3.1-8 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-4<br>(E-19) | 3.2.1-28 | D |
| | | | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-4<br>(E-19) | 3.2.1-28 | D |
| | Heat transfer | Stainless steel | Treated borated water > 140°F (ext) | Fouling | Water Chemistry Control – Primary and Secondary | | | H |
| | | | Treated water (int) | Fouling | Water Chemistry Control – Closed Cooling Water | VII.C2-3<br>(AP-63) | 3.3.1-52 | D |

| Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heater sheath | Pressure boundary | Stainless steel | Treated borated water > 140°F (ext) | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-20<br>(R-217) | 3.1.1-68 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Heater wells | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-2<br>(R-07) | 3.1.1-68 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Manway cover | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.1.1-58 | A |

**Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Manway insert plate | Pressure boundary | Stainless steel | Treated borated water > 140°F (ext) | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-2<br>(R-07) | 3.1.1-68 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Nozzle | Pressure boundary | Carbon steel w/stainless cladding | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.1.1-58 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary<br>One-Time Inspection – Small Bore Piping | IV.C2-2<br>(R-07)<br>IV.C2-1<br>(R-02) | 3.1.1-68<br>3.1.1-70 | E<br>E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

**Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Orifice | Pressure boundary & flow control | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary<br>One-Time Inspection – Small Bore Piping | IV.C2-2<br>(R-07)<br>IV.C2-1<br>(R-02) | 3.1.1-68<br>3.1.1-70 | E<br>E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Piping ≥ 4” nps | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-2<br>(R-07) | 3.1.1-68 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

**Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping < 4" nps (includes RV flange leak off lines) | Pressure boundary | Nickel alloy | Air – indoor (ext) | None | None | IV.E-1 (RP-03) | 3.1.1-85 | A |
|  |  |  | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15 (RP-23) | 3.1.1-83 | A |
|  |  |  |  | Cracking | Nickel Alloy Inspection<br>Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-13 (RP-31) | 3.1.1-31 | E |

| Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping < 4" nps | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F (int) | Cracking | One-Time Inspection – Small Bore Piping<br>Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-1<br>(R-02) | 3.1.1-70 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Pressurizer penetration | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-2<br>(R-07) | 3.1.1-68 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

| **Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Pressurizer shell and heads | Pressure boundary | Carbon steel with stainless cladding | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.1.1-58 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-18<br>(R-58) | 3.1.1-67 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Pressurizer spray head | Flow distribution | CASS | Treated borated water > 140°F (int) | Cracking | Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)<br>Water Chemistry Control – Primary and Secondary | IV.C2-3<br>(R-05) | 3.1.1-24 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | | Reduction of fracture toughness | Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) | IV.C2-4<br>(R-52) | 3.1.1-57 | C |

| **Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Pressurizer spray head coupling and locking bar | Flow distribution | Stainless steel | Treated borated water > 140°F | Cracking | Water Chemistry Control – Primary and Secondary | IV.C2-20<br>(R-217) | 3.1.1-68 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Pump casing | Pressure boundary | CASS | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-5<br>(R-09) | 3.1.1-68 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | | Reduction of fracture toughness | Inservice Inspection | IV.C2-6<br>(R-08) | 3.1.1-55 | E |

| **Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Safe end | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary<br>One-Time Inspection – Small Bore Piping | IV.C2-2<br>(R-07)<br>IV.C2-1<br>(R-02) | 3.1.1-68<br>3.1.1-70 | E<br>E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Support | Structural support | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.1.1-58 | A |
| | | | | | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | C |
| Support lug | Structural support | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.1.1-58 | A |

**Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Support skirt | Structural support | Carbon steel | Air – indoor (ext) | Cracking – fatigue | Inservice Inspection | IV.C2-16<br>(R-19) | 3.1.1-61 | E |
| | | | | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.1.1-58 | A |
| | | | | | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | C |
| Thermal sleeve | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-2<br>(R-07) | 3.1.1-68 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

**Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
|  |  |  | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
|  |  |  | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary<br>One-Time Inspection – Small Bore Piping | IV.C2-2<br>(R-07)<br>IV.C2-1<br>(R-02) | 3.1.1-68<br>3.1.1-70 | E<br>E |
|  |  |  |  | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
|  |  |  | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

**Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body ≥ 4” nps | Pressure boundary | CASS | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
|  |  |  | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-5<br>(R-09) | 3.1.1-68 | E |
|  |  |  |  | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
|  |  |  |  | Reduction of fracture toughness | Inservice Inspection | IV.C2-6<br>(R-08) | 3.1.1-55 | E |
|  |  | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
|  |  |  | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-5<br>(R-09) | 3.1.1-68 | E |
|  |  |  |  | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

**Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body < 4" nps | Pressure boundary | CASS | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F (int) | Cracking | One-Time Inspection – Small Bore Piping<br>Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-1<br>(R-02) | 3.1.1-70 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | | Reduction of fracture toughness | Inservice Inspection | IV.C2-6<br>(R-08) | 3.1.1-55 | E |

| **Table 3.1.2-3-IP2: Reactor Coolant Pressure Boundary** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body < 4" nps (continued) | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F (int) | Cracking | One-Time Inspection – Small Bore Piping<br>Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-1<br>(R-02) | 3.1.1-70 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

# Table 3.1.2-3-IP3
# Reactor Coolant Pressure Boundary
# Summary of Aging Management Review

**Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Reactor coolant system components | Pressure boundary | Carbon steel, stainless steel | Air – indoor (ext) | Cracking – fatigue | TLAA – metal fatigue | IV.C2-10<br>(R-18) | 3.1.1-7 | A, 102 |
| Reactor coolant system pressure boundary components | Pressure boundary | Carbon steel, stainless steel, CASS, nickel alloy, carbon steel with stainless steel or nickel alloy cladding | Treated borated water (ext) | Cracking – fatigue | TLAA – metal fatigue | IV.C2-25<br>(R-223) | 3.1.1-8 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.1.1-58 | A |
| | | | | | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | C |
| | | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A, 103 |

| Table 3.1.2-3-IP3:  Reactor Coolant Pressure Boundary | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Fittings (elbows, flanges, scoops, tees, etc.) | Pressure boundary | CASS | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)<br>Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-3<br>(R-05) | 3.1.1-24 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | | Reduction of fracture toughness | Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) | IV.C2-4<br>(R-52) | 3.1.1-57 | A |

**Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flex hose | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary<br>One-Time Inspection – Small Bore Piping<br>Inservice Inspection | IV.C2-1<br>(R-02) | 3.1.1-70 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Heat exchanger (bonnet) | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | VII.E1-5<br>(A-84) | 3.3.1-8 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

**Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.1.1-58 | A |
| | | | | | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | C |
| | | | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | IV.C2-14<br>(RP-10) | 3.1.1-53 | D |
| | | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | C |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | VII.E1-5<br>(A-84) | 3.3.1-8 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

**Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water > 140°F (ext) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-5<br>(A-84) | 3.3.1-8 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-5<br>(A-84) | 3.3.1-8 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-4<br>(E-19) | 3.2.1-28 | D |
| | | | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-4<br>(E-19) | 3.2.1-28 | D |
| | Heat transfer | Stainless steel | Treated borated water > 140°F (ext) | Fouling | Water Chemistry Control – Primary and Secondary | | | H |
| | | | Treated water (int) | Fouling | Water Chemistry Control – Closed Cooling Water | VII.C2-3<br>(AP-63) | 3.3.1-52 | D |

**Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heater sheath | Pressure boundary | Stainless steel | Treated borated water > 140°F (ext) | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-5<br>(R-09) | 3.1.1-68 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Heater wells | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-2<br>(R-07) | 3.1.1-68 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Manway cover | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.1.1-58 | A |

| **Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Manway insert plate | Pressure boundary | Stainless steel | Treated borated water > 140°F (ext) | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-2<br>(R-07) | 3.1.1-68 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Nozzle | Pressure boundary | Carbon steel w/stainless cladding | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.1.1-58 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary<br>One-Time Inspection – Small Bore Piping | IV.C2-2<br>(R-07)<br>IV.C2-1<br>(R-02) | 3.1.1-68<br>3.1.1-70 | E<br>E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

| **Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Orifice | Pressure boundary & flow control | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary<br>One-Time Inspection – Small Bore Piping | IV.C2-2<br>(R-07)<br>IV.C2-1<br>(R-02) | 3.1.1-68<br>3.1.1-70 | E<br>E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Piping ≥ 4” nps | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-2<br>(R-07) | 3.1.1-68 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

| Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping < 4" nps<br>(includes RV flange leak off lines) | Pressure boundary | Nickel alloy | Air – indoor (ext) | None | None | IV.E-1<br>(RP-03) | 3.1.1-85 | A |
| | | | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | | Cracking | Nickel Alloy Inspection<br>Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-13<br>(RP-31) | 3.1.1-31 | E |

**Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping < 4" nps | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F (int) | Cracking | One-Time Inspection – Small Bore Piping<br>Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-1<br>(R-02) | 3.1.1-70 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Pressurizer penetration | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-2<br>(R-07) | 3.1.1-68 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

**Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Pressurizer shell and heads | Pressure boundary | Carbon steel with stainless cladding | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.1.1-58 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-18<br>(R-58) | 3.1.1-67 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Pressurizer spray head | Flow distribution | CASS | Treated borated water > 140°F (int) | Cracking | Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)<br>Water Chemistry Control – Primary and Secondary | IV.C2-3<br>(R-05) | 3.1.1-24 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | | Reduction of fracture toughness | Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) | IV.C2-4<br>(R-52) | 3.1.1-57 | C |

| **Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Pressurizer spray head coupling and locking bar | Flow distribution | Stainless steel | Treated borated water > 140°F | Cracking | Water Chemistry Control – Primary and Secondary | IV.C2-20<br>(R-217) | 3.1.1-68 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Pump casing | Pressure boundary | CASS | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-5<br>(R-09) | 3.1.1-68 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | | Reduction of fracture toughness | Inservice Inspection | IV.C2-6<br>(R-08) | 3.1.1-55 | E |

| Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Safe end | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary<br>One-Time Inspection – Small Bore Piping | IV.C2-2<br>(R-07)<br>IV.C2-1<br>(R-02) | 3.1.1-68<br>3.1.1-70 | E<br>E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Support | Structural support | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.1.1-58 | A |
| | | | | | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | C |
| Support lug | Structural support | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.1.1-58 | A |

**Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Support skirt | Structural support | Carbon steel | Air – indoor (ext) | Cracking – fatigue | Inservice Inspection | IV.C2-16<br>(R-19) | 3.1.1-61 | E |
| | | | | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.1.1-58 | A |
| | | | | | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | C |
| Thermal sleeve | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-2<br>(R-07) | 3.1.1-68 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

| **Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary<br>One-Time Inspection – Small Bore Piping | IV.C2-2<br>(R-07)<br>IV.C2-1<br>(R-02) | 3.1.1-68<br>3.1.1-70 | E<br>E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

**Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body ≥ 4" nps | Pressure boundary | CASS | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
|  |  |  | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-5<br>(R-09) | 3.1.1-68 | E |
|  |  |  |  | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
|  |  |  |  | Reduction of fracture toughness | Inservice Inspection | IV.C2-6<br>(R-08) | 3.1.1-55 | E |
|  |  | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
|  |  |  | Treated borated water > 140°F (int) | Cracking | Inservice Inspection<br>Water Chemistry Control – Primary and Secondary | IV.C2-5<br>(R-09) | 3.1.1-68 | E |
|  |  |  |  | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

**Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body < 4" nps | Pressure boundary | CASS | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F (int) | Cracking | One-Time Inspection – Small Bore Piping<br>Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-1<br>(R-02) | 3.1.1-70 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | | Reduction of fracture toughness | Inservice Inspection | IV.C2-6<br>(R-08) | 3.1.1-55 | E |

**Table 3.1.2-3-IP3: Reactor Coolant Pressure Boundary**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body < 4" nps (continued) | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| | | | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |
| | | | Treated borated water > 140°F (int) | Cracking | One-Time Inspection – Small Bore Piping<br>Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.C2-1<br>(R-02) | 3.1.1-70 | E |
| | | | | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | A |

# Table 3.1.2-4-IP2
# Steam Generators
# Summary of Aging Management Review

**Table 3.1.2-4-IP2: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Steam generator components | Pressure boundary | Carbon steel, stainless steel, nickel alloy, carbon steel with stainless steel cladding | Treated borated water (int) | Cracking – fatigue | TLAA – metal fatigue | IV.D1-8<br>(R-221)<br>IV.D1-21<br>(R-46) | 3.1.1-10<br>3.1.1-6 | A<br>A |
| Steam generator components | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | IV.D1-11<br>(R-33) | 3.1.1-7 | A |
| Steam generator components | Pressure boundary | Stainless steel, nickel alloy | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | IV.D1-8<br>(R-221)<br>IV.D1-21<br>(R-46) | 3.1.1-10<br>3.1.1-6 | A, 102<br>A |

| **Table 3.1.2-4-IP2: Steam Generators** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| *Primary Side* | | | | | | | | |
| Bolting (primary manway) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | C |
| | | | | | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | C |
| Channel (primary) head | Pressure boundary | Carbon steel with stainless steel cladding on internal surfaces | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.D2-4<br>(R-35) | 3.1.1-35 | E |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| Channel (primary) head divider plate | Pressure boundary | Nickel alloy | Treated borated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary | IV.D1-6<br>(RP-21) | 3.1.1-81 | A |

**Table 3.1.2-4-IP2: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Primary nozzle | Pressure boundary | Carbon steel with stainless steel cladding on internal surfaces | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.D1-1<br>(R-07) | 3.1.1-68 | E |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| Primary nozzle safe end | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.D1-1<br>(R-07) | 3.1.1-68 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |

**Table 3.1.2-4-IP2: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Primary nozzle closure ring | Pressure boundary | Nickel alloy | Treated borated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15 (RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary | IV.D1-6 (RP-21) | 3.1.1-81 | C |
| Primary manway | Pressure boundary | Carbon steel with stainless steel cladding on internal surfaces | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15 (RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.D1-1 (R-07) | 3.1.1-68 | E |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3 (R-17) | 3.1.1-58 | A |
| Primary manway cover | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3 (R-17) | 3.1.1-58 | A |
| Primary manway cover insert plate | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15 (RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary | IV.D1-1 (R-07) | 3.1.1-68 | E |

**Table 3.1.2-4-IP2: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubesheet | Pressure boundary | Carbon steel with nickel-alloy clad on primary side only | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D2-4<br>(R-35) | 3.1.1-35 | E |
| | | | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8<br>(R-224) | 3.1.1-12 | C, 104 |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |

**Table 3.1.2-4-IP2: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tube | Pressure boundary | Nickel alloy | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.C2-15<br>(RP-23) | 3.1.1-83 | C |
|  |  |  |  | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-20<br>(R-44) | 3.1.1-73 | A |
|  |  |  | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | C |
|  |  |  |  | Loss of material – wear | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-24<br>(R-49) | 3.1.1-72 | A |
|  |  |  |  | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-22<br>(R-48) | 3.1.1-72 | A |

| **Table 3.1.2-4-IP2: Steam Generators** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tube | Heat transfer | Nickel alloy | Treated borated water (int) | Fouling | Water Chemistry Control – Primary and Secondary | -- | -- | H |
| | | | Treated water (ext) | Fouling | Water Chemistry Control – Primary and Secondary | -- | -- | H |
| Tube plug | Pressure boundary | Nickel alloy | Treated borated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-18<br>(R-40) | 3.1.1-73 | A |
| *Secondary Side Externals* | | | | | | | | |
| Bolting<br>(secondary manway, handhole, and inspection port) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| | | | | | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | C |

**Table 3.1.2-4-IP2: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Shell<br>(Lower shell, upper shell, transition cone, elliptical upper head) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.D1-12<br>(R-34) | 3.1.1-16 | E |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| Feedwater nozzle | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8<br>(R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| Steam outlet nozzle | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8<br>(R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| Secondary manway (upper shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8<br>(R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |

**Table 3.1.2-4-IP2: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Secondary manway cover | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8 (R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3 (R-17) | 3.1.1-58 | A |
| Secondary handhole and inspection port, inspection port threaded plug | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8 (R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3 (R-17) | 3.1.1-58 | A |
| Secondary handhole and inspection port cover | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8 (R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3 (R-17) | 3.1.1-58 | A |
| Secondary shell drain connection | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8 (R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3 (R-17) | 3.1.1-58 | A |

| Table 3.1.2-4-IP2: Steam Generators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Instrument connections: steam drum pressure, narrow range water level, and wide range water level | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8<br>(R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| Steam flow restrictor (inside main steam nozzle) | Flow control | Nickel alloy | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-1<br>(SP-18) | 3.4.1-37 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |
| Blowdown pipe connection (nozzle) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8<br>(R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |

| Table 3.1.2-4-IP2: Steam Generators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| *Secondary Side Internals* | | | | | | | | |
| Flow distribution baffle | Flow distribution | Stainless steel | Treated water > 140°F (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |
| Tube bundle wrapper and cone assembly | Flow distribution | Carbon steel | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-9<br>(RP-16) | 3.1.1-76 | A |

**Table 3.1.2-4-IP2: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tube bundle wrapper handhole plug assembly | Flow distribution | Carbon steel | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-9<br>(RP-16) | 3.1.1-76 | C |
| | | Stainless steel | Treated water > 140°F (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |
| Tube support plate | Structural support | Stainless steel | Treated water > 140°F (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |

**Table 3.1.2-4-IP2: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tube support plate stayrod | Structural support | Carbon steel | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-9<br>(RP-16) | 3.1.1-76 | C |
| Tube support plate stayrod spacer pipe | Structural support | Carbon steel | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-9<br>(RP-16) | 3.1.1-76 | C |
| Tube support plate stayrod nut | Structural support | Stainless steel | Treated water > 140°F (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |

**Table 3.1.2-4-IP2: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tube support plate stayrod washer | Structural support | Nickel alloy | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |
| Anti-vibration bar and peripheral retaining ring | Structural support | Nickel alloy | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | A |
| | | | | Loss of material – wear | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | E |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | A |

**Table 3.1.2-4-IP2: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Feedwater ring and fittings | Flow distribution | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-9<br>(RP-16)<br>IV.D1-26<br>(R-51) | 3.1.1-76<br>3.1.1-32 | C<br>E |
|  |  |  | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-9<br>(RP-16) | 3.1.1-76 | C |

| **Table 3.1.2-4-IP2: Steam Generators** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Feedwater ring J-nozzles | Flow distribution | Nickel alloy | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |
| | | | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |

**Table 3.1.2-4-IP2: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Feedwater nozzle thermal sleeve | Pressure boundary | Nickel alloy | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | E |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |
| *Steam Generator Instrumentation* | | | | | | | | |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-2<br>(RP-04) | 3.1.1-86 | C |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4<br>(SP-16) | 3.4.1-16 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5<br>(SP-17) | 3.4.1-14 | C |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |

**Table 3.1.2-4-IP2: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4 (SP-16) | 3.4.1-16 | C |
|  |  |  |  | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5 (SP-17) | 3.4.1-14 | C |
|  |  |  | Air – indoor (ext) | None | None | IV.E-3 (RP-05) | 3.1.1-86 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4 (SP-16) | 3.4.1-16 | C |
|  |  |  |  | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5 (SP-17) | 3.4.1-14 | C |
|  |  |  | Air – indoor (ext) | None | None | IV.E-3 (RP-05) | 3.1.1-86 | A |

# Table 3.1.2-4-IP3
# Steam Generators
# Summary of Aging Management Review

**Table 3.1.2-4-IP3: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Steam generator components | Pressure boundary | Carbon steel, stainless steel, nickel alloy, carbon steel with stainless steel cladding | Treated borated water (int) | Cracking – fatigue | TLAA – metal fatigue | IV.D1-8 (R-221)<br>IV.D1-21 (R-46) | 3.1.1-10<br>3.1.1-6 | A<br>A |
| Steam generator components | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | IV.D1-11 (R-33) | 3.1.1-7 | A |
| Steam generator components | Pressure boundary | Stainless steel, nickel alloy | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | IV.D1-8 (R-221)<br>IV.D1-21 (R-46) | 3.1.1-10<br>3.1.1-6 | A, 102<br>A |

**Table 3.1.2-4-IP3: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| *Primary Side* | | | | | | | | |
| Bolting (primary manway) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | C |
| | | | | | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | C |
| Channel (primary) head | Pressure boundary | Carbon steel with stainless steel cladding on internal surfaces | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.D2-4<br>(R-35) | 3.1.1-35 | E |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| Channel (primary) head divider plate | Pressure boundary | Nickel alloy | Treated borated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary | IV.D1-6<br>(RP-21) | 3.1.1-81 | A |

| **Table 3.1.2-4-IP3: Steam Generators** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Primary nozzle | Pressure boundary | Carbon steel with stainless steel cladding on internal surfaces | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.D1-1<br>(R-07) | 3.1.1-68 | E |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| Primary nozzle safe end | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.D1-1<br>(R-07) | 3.1.1-68 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |

**Table 3.1.2-4-IP3: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Primary nozzle closure ring | Pressure boundary | Nickel alloy | Treated borated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary | IV.D1-6<br>(RP-21) | 3.1.1-81 | C |
| Primary manway | Pressure boundary | Carbon steel with stainless steel cladding on internal surfaces | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.D1-1<br>(R-07) | 3.1.1-68 | E |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| Primary manway cover | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| Primary manway cover insert plate | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary | IV.D1-1<br>(R-07) | 3.1.1-68 | E |

**Table 3.1.2-4-IP3: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubesheet | Pressure boundary | Carbon steel with nickel-alloy clad on primary side only | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15 (RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D2-4 (R-35) | 3.1.1-35 | E |
| | | | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8 (R-224) | 3.1.1-12 | C, 104 |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3 (R-17) | 3.1.1-58 | A |

**Table 3.1.2-4-IP3: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tube | Pressure boundary | Nickel alloy | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.C2-15<br>(RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-20<br>(R-44) | 3.1.1-73 | A |
| | | | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | C |
| | | | | Loss of material – wear | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-24<br>(R-49) | 3.1.1-72 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-22<br>(R-48) | 3.1.1-72 | A |

| **Table 3.1.2-4-IP3: Steam Generators** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tube | Heat transfer | Nickel alloy | Treated borated water (int) | Fouling | Water Chemistry Control – Primary and Secondary | -- | -- | H |
| | | | Treated water (ext) | Fouling | Water Chemistry Control – Primary and Secondary | -- | -- | H |
| Tube plug | Pressure boundary | Nickel alloy | Treated borated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.C2-15<br>(RP-23) | 3.1.1-83 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-18<br>(R-40) | 3.1.1-73 | A |
| *Secondary Side Externals* | | | | | | | | |
| Bolting<br>(secondary manway, handhole, and inspection port) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| | | | | | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | C |

**Table 3.1.2-4-IP3: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Shell<br>(lower shell, upper shell, transition cone, elliptical upper head) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Inservice Inspection | IV.D1-12<br>(R-34) | 3.1.1-16 | E |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| Feedwater nozzle | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8<br>(R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| Steam outlet nozzle | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8<br>(R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| Secondary manway (upper shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8<br>(R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |

**Table 3.1.2-4-IP3: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Secondary manway cover | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8<br>(R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| Secondary handhole and inspection port, inspection port threaded plug | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8<br>(R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| Secondary handhole and inspection port cover | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8<br>(R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |

| Table 3.1.2-4-IP3: Steam Generators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Secondary handhole cover RTD boss | Pressure boundary | Nickel alloy | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D1-15<br>(RP-15) | 3.1.1-74 | E |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary | IV.D2-9<br>(R-36) | 3.1.1-84 | A, 104 |
| | | | Air – indoor (ext) | None | None | IV.E-1<br>(RP-03 | 3.1.1-85 | A |
| Secondary handhole cover RTD well | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4<br>(SP-16) | 3.4.1-16 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary | IV.D1-14<br>(RP-14) | 3.1.1-74 | E |
| | | | Air – indoor (ext) | None | None | IV.E-3<br>(RP-05) | 3.1.1-86 | A |
| Secondary shell drain connection | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8<br>(R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |

| **Table 3.1.2-4-IP3: Steam Generators** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Instrument connections: steam drum pressure, narrow range water level, wide range water level, and sampling | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8<br>(R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |
| Steam flow restrictor (inside main steam nozzle) | Flow control | Nickel alloy | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-1<br>(SP-18) | 3.4.1-37 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |
| Blowdown pipe connection (nozzle) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | IV.D2-8<br>(R-224) | 3.1.1-12 | C |
| | | | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.D1-3<br>(R-17) | 3.1.1-58 | A |

**Table 3.1.2-4-IP3: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| *Secondary Side Internals* | | | | | | | | |
| Flow distribution baffle | Flow distribution | Stainless steel | Treated water > 140°F (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |
| Tube bundle wrapper and cone assembly | Flow distribution | Carbon steel | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-9<br>(RP-16) | 3.1.1-76 | A |

| **Table 3.1.2-4-IP3: Steam Generators** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tube bundle wrapper handhole plug assembly | Flow distribution | Carbon steel | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-9<br>(RP-16) | 3.1.1-76 | C |
| | | Stainless steel | Treated water > 140°F (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |
| Tube support plate | Structural support | Stainless steel | Treated water > 140°F (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |

**Table 3.1.2-4-IP3: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tube support plate stayrod | Structural support | Carbon steel | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-9<br>(RP-16) | 3.1.1-76 | C |
| Tube support plate stayrod spacer pipe | Structural support | Carbon steel | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-9<br>(RP-16) | 3.1.1-76 | C |
| Tube support plate stayrod nut | Structural support | Stainless steel | Treated water > 140°F (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |

**Table 3.1.2-4-IP3: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tube support plate stayrod washer | Structural support | Nickel alloy | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |
| Anti-vibration bar | Structural support | Stainless steel | Treated water > 140°F (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | A |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | A |

**Table 3.1.2-4-IP3: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Anti-vibration bar end caps and peripheral retaining ring | Structural support | Nickel alloy | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | A |
| | | | | Loss of material-wear | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | E |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | A |
| Feedwater ring and fittings | Flow distribution | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-9<br>(RP-16)<br>IV.D1-26<br>(R-51) | 3.1.1-76<br>3.1.1-32 | C<br>E |
| | | | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-9<br>(RP-16) | 3.1.1-76 | C |

| Table 3.1.2-4-IP3: Steam Generators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Feedwater ring J-nozzles | Flow distribution | Nickel alloy | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |
| | | | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15<br>(RP-15) | 3.1.1-74 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14<br>(RP-14) | 3.1.1-74 | C |

| **Table 3.1.2-4-IP3: Steam Generators** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Feedwater nozzle thermal sleeve | Pressure boundary | Nickel alloy | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-15 (RP-15) | 3.1.1-74 | E |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary<br>Steam Generator Integrity | IV.D1-14 (RP-14) | 3.1.1-74 | C |
| *Steam Generator Instrumentation* | | | | | | | | |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-2 (RP-04) | 3.1.1-86 | C |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4 (SP-16) | 3.4.1-16 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5 (SP-17) | 3.4.1-14 | C |
| | | | Air – indoor (ext) | None | None | IV.E-3 (RP-05) | 3.1.1-86 | A |

**Table 3.1.2-4-IP3: Steam Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4 (SP-16) | 3.4.1-16 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5 (SP-17) | 3.4.1-14 | C |
| | | | Air – indoor (ext) | None | None | IV.E-3 (RP-05) | 3.1.1-86 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4 (SP-16) | 3.4.1-16 | C |
| | | | | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5 (SP-17) | 3.4.1-14 | C |
| | | | Air – indoor (ext) | None | None | IV.E-3 (RP-05) | 3.1.1-86 | A |

## 3.2 ENGINEERED SAFETY FEATURES SYSTEMS

### 3.2.1 Introduction

This section provides the results of the aging management reviews for components in the engineered safety features (ESF) systems that are subject to aging management review. The following systems are addressed in this section (system descriptions are available in the referenced sections).

- Residual Heat Removal System (Section 2.3.2.1)
- Containment Spray System (Section 2.3.2.2)
- Containment Isolation Support System (Section 2.3.2.3)
- Safety Injection System (Section 2.3.2.4)
- Containment Penetrations (Section 2.3.2.5)

Table 3.2.1, Summary of Aging Management Programs for Engineered Safety Features Evaluated in Chapter V of NUREG-1801, provides the summary of the programs evaluated in NUREG-1801 for the engineered safety features component groups. This table uses the format described in the introduction to Section 3. Hyperlinks are provided to the program evaluations in Appendix B.

### 3.2.2 Results

The following system tables summarize the results of aging management reviews and the NUREG-1801 comparison for systems in the ESF system group.

- Table 3.2.2-1-IP2 Residual Heat Removal System—Summary of Aging Management Review
- Table 3.2.2-1-IP3 Residual Heat Removal System—Summary of Aging Management Review
- Table 3.2.2-2-IP2 Containment Spray System—Summary of Aging Management Review
- Table 3.2.2-2-IP3 Containment Spray System—Summary of Aging Management Review
- Table 3.2.2-3-IP2 Containment Isolation Support System—Summary of Aging Management Review
- Table 3.2.2-3-IP3 Containment Isolation Support System—Summary of Aging Management Review
- Table 3.2.2-4-IP2 Safety Injection System—Summary of Aging Management Review
- Table 3.2.2-4-IP3 Safety Injection System—Summary of Aging Management Review

- Table 3.2.2-5-IP2 Containment Penetrations—Summary of Aging Management Review
- Table 3.2.2-5-IP3 Containment Penetrations—Summary of Aging Management Review

### 3.2.2.1 Materials, Environments, Aging Effects Requiring Management and Aging Management Programs

The following sections list the materials, environments, aging effects requiring management, and aging management programs for the ESF systems. Programs are described in Appendix B. Further details are provided in the system tables.

#### 3.2.2.1.1 Residual Heat Removal System

**Materials**

Residual heat removal system components are constructed of the following materials.

- carbon steel
- stainless steel

**Environment**

Residual heat removal system components are exposed to the following environments.

- air – indoor
- air – treated
- concrete
- raw water
- treated borated water
- treated borated water > 140°F
- treated water

**Aging Effects Requiring Management**

The following aging effects associated with the residual heat removal system require management.

- cracking
- cracking – fatigue
- fouling
- loss of material
- loss of material – wear

### Aging Management Programs

The following aging management programs manage the aging effects for the residual heat removal components.

- Bolting Integrity
- Boric Acid Corrosion Prevention
- External Surfaces Monitoring
- Heat Exchanger Monitoring
- Periodic Surveillance and Preventive Maintenance
- Water Chemistry Control – Closed Cooling Water
- Water Chemistry Control – Primary and Secondary

## 3.2.2.1.2 Containment Spray System

### Materials

Containment spray system components are constructed of the following materials.

- carbon steel
- carbon steel with stainless cladding
- stainless steel

### Environment

Containment spray system components are exposed to the following environments.

- air – indoor
- air – outdoor
- treated borated water
- treated water

### Aging Effects Requiring Management

The following aging effects associated with the containment spray system require management.

- cracking
- loss of material

### Aging Management Programs

The following aging management programs manage the aging effects for containment spray system components.

- Bolting Integrity
- Boric Acid Corrosion Prevention

- External Surfaces Monitoring
- Periodic Surveillance and Preventive Maintenance
- Water Chemistry Control – Auxiliary Systems
- Water Chemistry Control – Primary and Secondary

### 3.2.2.1.3 Containment Isolation Support System

#### Materials

Containment isolation support system components are constructed of the following materials.

- aluminum
- carbon steel
- carbon steel with stainless cladding
- copper alloy
- copper alloy > 15% Zn
- stainless steel

#### Environment

Containment isolation support system components are exposed to the following environments.

- air – indoor
- air – treated
- gas
- treated water

#### Aging Effects Requiring Management

The following aging effects associated with the containment isolation support system require management.

- loss of material

#### Aging Management Programs

The following aging management programs manage the aging effects for containment isolation support system components.

- Bolting Integrity
- External Surfaces Monitoring
- Water Chemistry Control – Primary and Secondary

### 3.2.2.1.4 Safety Injection System

**Materials**

Safety injection system components are constructed of the following materials.

- carbon steel
- carbon steel with stainless cladding
- CASS
- copper alloy
- copper alloy > 15% zinc
- gray cast iron
- stainless steel

**Environment**

Safety injection system components are exposed to the following environments.

- air – indoor
- air – outdoor
- concrete
- gas
- lube oil
- soil
- steam
- treated borated water
- treated borated water > 140°F
- treated water

**Aging Effects Requiring Management**

The following aging effects associated with the safety injection system require management.

- cracking
- cracking – fatigue
- fouling
- loss of material
- loss of material – wear

**Aging Management Programs**

The following aging management programs manage the aging effects for safety injection system components.

- Bolting Integrity

- Boric Acid Corrosion Prevention
- Buried Piping and Tanks Inspection
- External Surfaces Monitoring
- Heat Exchanger Monitoring
- Oil Analysis
- Periodic Surveillance and Preventive Maintenance
- Selective Leaching
- Water Chemistry Control – Closed Cooling Water
- Water Chemistry Control – Primary and Secondary

### 3.2.2.1.5 Containment Penetrations

#### Materials

Containment penetration components are constructed of the following materials.

- carbon steel
- copper alloy
- stainless steel

#### Environment

Containment penetration components are exposed to the following environments.

- air – indoor
- condensation
- gas
- treated water

#### Aging Effects Requiring Management

The following aging effects associated with containment penetration components require management.

- loss of material

#### Aging Management Programs

The following aging management programs manage the aging effects for containment penetration components.

- Bolting Integrity
- External Surfaces Monitoring
- One-Time Inspection
- Water Chemistry Control – Primary and Secondary

### 3.2.2.2 Further Evaluation of Aging Management as Recommended by NUREG-1801

NUREG-1801 indicates that further evaluation is necessary for certain aging effects and other issues discussed in Section 3.2.2.2 of NUREG-1800. The following sections are numbered in accordance with the discussions in NUREG-1800 and explain the IPEC approach to those areas requiring further evaluation. Programs are described in Appendix B

#### 3.2.2.2.1 Cumulative Fatigue Damage

Where identified as an aging effect requiring management, the analysis of fatigue is a TLAA as defined in 10 CFR 54.3. TLAAs are evaluated in accordance with 10 CFR 54.21(c). Evaluation of this TLAA is addressed in Section 4.3.

#### 3.2.2.2.2 Loss of Material due to Cladding [Breach]

Loss of material could occur due to a breach of stainless steel cladding on steel pump casings. There are no stainless clad steel pump casings in the ESF systems of IPEC. Pump casings exposed to borated water are stainless steel. This item is therefore not applicable.

#### 3.2.2.2.3 Loss of Material due to Pitting and Crevice Corrosion

1. Loss of material due to pitting and crevice corrosion for internal surfaces of stainless steel piping and components in containment isolation components exposed to treated water is managed by the Water Chemistry Control – Primary and Secondary Program. The effectiveness of the Water Chemistry Control – Primary and Secondary Program will be confirmed by the One-Time Inspection Program through an inspection of a representative sample of components crediting this program including susceptible locations such as areas of stagnant flow.

2. Loss of material from pitting and crevice corrosion for stainless steel piping and piping components exposed to a soil environment is managed by the Buried Piping and Tanks Inspection Program. The Buried Piping and Tanks Inspection Program will include (a) preventive measures to mitigate corrosion and (b) inspections to manage the effects of corrosion on the pressure-retaining capability of buried carbon steel, copper alloy, gray cast iron, and stainless steel components. Buried components will be inspected when excavated during maintenance. An inspection will be performed within ten years of entering the period of extended operation and within ten years after entering the period of extended operation, unless an opportunistic inspection occurred within these ten-year periods.

3. This item addresses loss of material for BWR components exposed to treated water. IP2 and IP3 are PWRs; consequently, this item is not applicable.

4. Loss of material from pitting and crevice corrosion could occur for copper alloy and stainless steel piping and components in ESF systems that are exposed to lubricating oil. Loss of material is managed by the Oil Analysis Program, which includes periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. The One-Time Inspection Program will use visual inspections or non-destructive examinations of representative samples to confirm that the Oil Analysis Program has been effective at managing aging effects for components crediting this program.

5. Loss of material from pitting and crevice corrosion could occur for partially encased stainless steel tanks exposed to raw water due to cracking of the perimeter seal from weathering. At IPEC the bottom of outdoor stainless steel tanks in the ESF systems are not exposed to raw water because the design precludes the entry of water under the tank. In addition to a perimeter seal under the tank lip, the tanks have been grouted behind the seal between the concrete foundation and the tank bottom to a depth of eighteen inches. This design will not allow water leakage from the outside to get under the tank. This item is therefore not applicable.

6. Loss of material from pitting and crevice corrosion for ESF stainless steel components internally exposed to condensation at IPEC is managed by the One-Time Inspection Program. This program uses visual and other NDE techniques to confirm that loss of material is not occurring or is so insignificant that an aging management program for these components is not warranted.

#### 3.2.2.2.4 Reduction of Heat Transfer due to Fouling

1. Reduction of heat transfer due to fouling for copper alloy heat exchanger tubes exposed to lubricating oil in ESF systems is managed by the Oil Analysis Program. There are no stainless steel or steel heat exchanger tubes exposed to lubricating oil in the ESF systems. This program includes periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to fouling. The One-Time Inspection Program will use visual inspections or non-destructive examinations of representative samples to confirm that the Oil Analysis Program has been effective at managing aging effects for components crediting this program.

2. Reduction of heat transfer due to fouling could occur for stainless steel heat exchanger tubes exposed to treated water. There are no stainless steel heat exchanger tubes exposed to treated water with an intended function of heat transfer in the ESF systems. This item is therefore not applicable.

#### 3.2.2.2.5 Hardening and Loss of Strength due to Elastomer Degradation

This item addresses elastomer degradation for BWR standby gas treatment system components. IP2 and IP3 are PWRs and do not have standby gas treatment system; consequently, this item is not applicable.

#### 3.2.2.2.6 Loss of Material due to Erosion

This discussion refers to stainless steel high pressure safety injection (HPSI) pump miniflow recirculation orifice exposed to treated borated water. IP2 and IP3 use separate positive displacement pumps to provide normal makeup to the RCS. Therefore, this item is not applicable.

#### 3.2.2.2.7 Loss of Material due to General Corrosion and Fouling

This item refers to loss of material for steel drywell and suppression chamber components of BWRs. IP2 and IP3 are PWRs; consequently, this item is not applicable.

#### 3.2.2.2.8 Loss of Material due to General, Pitting, and Crevice Corrosion

1. This item concerns loss of material for BWR steel components exposed to treated water. IP2 and IP3 are PWRs; consequently, this item is not applicable.

2. Loss of material due to general, pitting and crevice corrosion for primary containment penetration steel piping and components exposed to treated water is managed by the Water Chemistry Control – Primary and Secondary Program. The effectiveness of the Water Chemistry Control – Primary and Secondary Program will be confirmed by the One-Time Inspection Program through an inspection of a representative sample of components crediting this program including susceptible locations such as areas of stagnant flow.

3. Loss of material due to general, pitting and crevice corrosion for steel piping and components in ESF systems exposed to lubricating oil is managed by the Oil Analysis Program. This program includes periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. The One-Time Inspection Program will use visual inspections or non-destructive examinations of representative samples to confirm that the Oil Analysis Program has been effective at managing aging effects for components crediting this program.

#### 3.2.2.2.9 Loss of Material due to General, Pitting, Crevice, and Microbiologically-Influenced Corrosion (MIC)

This item addresses loss of material for steel (with or without coating or wrapping) piping buried in soil. There are no buried carbon steel components in ESF systems with intended functions for license renewal at IP2 or IP3. Therefore, this item is not applicable.

#### 3.2.2.2.10 Quality Assurance for Aging Management of Nonsafety-Related Components

See Appendix B Section B.0.3 for discussion of IPEC quality assurance procedures and administrative controls for aging management programs.

### 3.2.2.3 Time-Limited Aging Analyses

The only time-limited aging analysis identified for the ESF systems components is metal fatigue. This is evaluated in Section 4.3.

## 3.2.3 Conclusion

The ESF system components that are subject to aging management review have been identified in accordance with the requirements of 10 CFR 54.21. The aging management programs selected to manage the effects of aging on ESF components are identified in Section 3.2.2.1 and in the following tables. A description of these aging management programs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation.

Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the ESF components will be managed such that there is reasonable assurance that the intended functions will be maintained consistent with the current licensing basis during the period of extended operation.

# Table 3.2.1
# Summary of Aging Management Programs for Engineered Safety Features Evaluated in Chapter V of NUREG-1801

**Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.2.1-1 | Steel and stainless steel piping, piping components, and piping elements in emergency core cooling system | Cumulative fatigue damage | TLAA, evaluated in accordance with 10 CFR 54.21(c) | Yes, TLAA | Fatigue is a TLAA.<br>See Section 3.2.2.2.1. |
| 3.2.1-2 | Steel with stainless steel cladding pump casing exposed to treated borated water | Loss of material/ 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, verify that plant-specific program addresses cladding breach. | Not applicable. There are no pump casings of steel with stainless steel cladding in the ESF systems.<br>See Section 3.2.2.2.2. |

**Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.2.1-3 | Stainless steel containment isolation piping and components internal surfaces exposed to treated water | Loss of material due to pitting and crevice corrosion | Water Chemistry and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Consistent with NUREG-1801. The loss of material in stainless steel components is managed by theWater Chemistry Control – Primary and Secondary Program. The One-Time Inspection Program will be used to verify the effectiveness of the water chemistry program.<br>See Section 3.2.2.2.3 item 1. |
| 3.2.1-4 | 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, plant specific | The Buried Piping and Tanks Inspection Program manages loss of material in stainless steel components exposed to soil.<br>See Section 3.2.2.2.3 item 2. |
| 3.2.1-5 | BWR only | | | | |
| 3.2.1-6 | Stainless steel and copper alloy piping, piping components, and piping elements exposed to lubricating oil | Loss of material due to pitting and crevice corrosion | Lubricating Oil Analysis and One-Time Inspection | Yes, detection of aging effects is to be evaluated | The Oil Analysis Program manages loss of material in stainless and copper alloy components. The One-Time Inspection Program will be used to confirm the effectiveness of the Oil Analysis Program.<br>See Section 3.2.2.2.3 item 4. |

**Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.2.1-7 | Partially encased stainless steel tanks with breached moisture barrier exposed to raw water | Loss of material due to pitting and crevice corrosion | A plant-specific aging management program is to be evaluated for pitting and crevice corrosion of tank bottoms because moisture and water can egress under the tank due to cracking of the perimeter seal from weathering. | Yes, plant specific | Not applicable. The outdoor stainless steel tank bottoms in the ESF systems are not exposed to raw water because the design of the tank foundation precludes the entry of water under the tank.<br>See Section 3.2.2.2.3 item 5. |
| 3.2.1-8 | Stainless steel piping, piping components, piping elements, and tank internal surfaces exposed to condensation (internal) | Loss of material due to pitting and crevice corrosion | A plant-specific aging management program is to be evaluated. | Yes, plant specific | The One-Time Inspection Program will confirm that loss of material is not occurring or is insignificant for internal stainless steel surfaces exposed to condensation in ESF systems.<br>See Section 3.2.2.2.3 item 6. |

**Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.2.1-9 | Steel, stainless steel, and copper alloy heat exchanger tubes exposed to lubricating oil | Reduction of heat transfer due to fouling | Lubricating Oil Analysis and One-Time Inspection | Yes, detection of aging effects is to be evaluated | The Oil Analysis Program manages reduction of heat transfer in copper alloy heat exchanger tubes. The One-Time Inspection Program will be used to confirm the effectiveness of the Oil Analysis Program. There are no stainless steel or steel heat exchanger tubes exposed to lube oil in the ESF systems.<br>See Section 3.2.2.2.4 item 1. |
| 3.2.1-10 | Stainless steel heat exchanger tubes exposed to treated water | Reduction of heat transfer due to fouling | Water Chemistry and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Not applicable. There are no stainless steel heat exchanger tubes exposed to treated water with an intended function of heat transfer in the ESF systems.<br>See Section 3.2.2.2.4 item 2. |
| 3.2.1-11 | BWR only | | | | |
| 3.2.1-12 | Stainless steel high-pressure safety injection (charging) pump miniflow orifice exposed to treated borated water | Loss of material due to erosion | A plant-specific aging management program is to be evaluated for erosion of the orifice due to extended use of the centrifugal HPSI pump for normal charging. | Yes, plant specific | Not applicable. IP2 and IP3 use separate positive displacement pumps to provide normal makeup to the RCS.<br>See Section 3.2.2.2.6. |
| 3.2.1-13 | BWR only | | | | |

| Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1 | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 3.2.1-14 | BWR only | | | | |
| 3.2.1-15 | Steel containment isolation piping, piping components, and piping elements internal surfaces exposed to treated water | Loss of material due to general, pitting, and crevice corrosion | Water Chemistry and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Consistent with NUREG-1801. The loss of material in steel components is managed by the Water Chemistry Control – Primary and Secondary Program. The One-Time Inspection Program will be used to verify the effectiveness of the water chemistry program.<br>See Section 3.2.2.2.8 item 2. |
| 3.2.1-16 | Steel piping, piping components, and piping elements exposed to lubricating oil | Loss of material due to general, pitting, and crevice corrosion | Lubricating Oil Analysis and One-Time Inspection | Yes, detection of aging effects is to be evaluated | The Oil Analysis Program manages loss of material in steel components exposed to lubricating oil. The One-Time Inspection Program will be used to confirm the effectiveness of the Oil Analysis Program.<br>See Section 3.2.2.2.8 item 3. |

**Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.2.1-17 | Steel (with or without coating or wrapping) piping, piping components, and piping elements buried in soil | Loss of material due to general, pitting, crevice, and microbiologically-influenced corrosion | Buried Piping and Tanks Surveillance<br>or<br>Buried Piping and Tanks Inspection | No<br>Yes, detection of aging effects and operating experience are to be further evaluated | Not applicable. There are no buried steel components in the ESF systems with intended functions for license renewal.<br>See Section 3.2.2.2.9. |
| 3.2.1-18 | BWR only | | | | |
| 3.2.1-19 | BWR only | | | | |
| 3.2.1-20 | BWR only | | | | |
| 3.2.1-21 | High-strength steel closure bolting exposed to air with steam or water leakage | Cracking due to cyclic loading, stress corrosion cracking | Bolting Integrity | No | Not applicable. High strength steel closure bolting is not used in ESF systems. |
| 3.2.1-22 | Steel closure bolting exposed to air with steam or water leakage | Loss of material due to general corrosion | Bolting Integrity | No | Not applicable. All steel closure bolting exposed to air (external) is conservatively assumed to be exposed to indoor uncontrolled air (see Item Number 3.2.1-23). |

**Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.2.1-23 | Steel bolting and closure bolting exposed to air – outdoor (external), or air – indoor uncontrolled (external) | Loss of material due to general, pitting, and crevice corrosion | Bolting Integrity | No | Consistent with NUREG-1801. The Bolting Integrity Program manages loss of material for steel bolting. |

**Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.2.1-24 | Steel closure bolting exposed to air – indoor uncontrolled (external) | Loss of preload due to thermal effects, gasket creep, and self-loosening | Bolting Integrity | No | Loss of preload is a design-driven effect and not an aging effect requiring management. Most bolting at IPEC is standard grade B7 low alloy steel, or similar material, except in specialized applications such as where stainless steel bolting is utilized. Loss of preload due to stress relaxation (creep) would only be a concern in very high temperature applications (> 700°F) as stated in the ASME Code, Section II, Part D, Table 4. No IPEC bolting operates at > 700°F. Therefore, loss of preload due to stress relaxation (creep) is not an applicable aging effect for ESF systems. Other issues that may result in pressure boundary joint leakage are improper design or maintenance issues. Improper bolting application (design) and maintenance issues are current plant operational concerns and not related to aging effects or mechanisms that require management during the period of extended operation.<br>(continued) |

| Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1 | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| | | | | | As described in the Bolting Integrity Program, IPEC has taken actions to address NUREG–1339, *Resolution to Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants*. These actions include implementation of good bolting practices in accordance with EPRI NP-5067, "Good Bolting Practices." Proper joint preparation and make-up in accordance with industry standards is expected to preclude loss of preload. This has been confirmed by operating experience at IPEC. |
| 3.2.1-25 | Stainless steel piping, piping components, and piping elements exposed to closed cycle cooling water >60°C (>140°F) | Cracking due to stress corrosion cracking | Closed-Cycle Cooling Water System | No | Not applicable. Closed cycle cooling water environments are maintained below 140°F for the in-scope portions of the ESF systems. |
| 3.2.1-26 | 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 | No | Not applicable. There are no steel piping, piping components, and piping elements exposed to closed cycle cooling water in the in-scope portions of the ESF systems. |

**Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.2.1-27 | Steel 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 | No | Consistent with NUREG-1801. The Water Chemistry Control – Closed Cooling Water Program manages loss of material for steel components. |
| 3.2.1-28 | Stainless steel piping, piping components, piping elements, and heat exchanger components exposed to closed-cycle cooling water | Loss of material due to pitting and crevice corrosion | Closed-Cycle Cooling Water System | No | Consistent with NUREG-1801. The Water Chemistry Control – Closed Cooling Water Program manages loss of material for stainless steel components. |
| 3.2.1-29 | 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 | No | Consistent with NUREG-1801. The Water Chemistry Control – Closed Cooling Water Program manages loss of material for copper alloy components. |
| 3.2.1-30 | 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 | No | Consistent with NUREG-1801. The Water Chemistry Control – Closed Cooling Water Program manages fouling for stainless steel and copper alloy components. |

**Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.2.1-31 | External surfaces of steel components including ducting, piping, ducting closure bolting, and containment isolation piping external surfaces exposed to air – indoor uncontrolled (external); condensation (external) and air – outdoor (external) | Loss of material due to general corrosion | External Surfaces Monitoring | No | Consistent with NUREG-1801. The External Surfaces Monitoring Program manages loss of material for external surfaces of steel components. |

**Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.2.1-32 | Steel piping and ducting components and internal surfaces exposed to air-indoor uncontrolled (Internal) | Loss of material due to general corrosion | Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components | No | The loss of material from the internal surfaces of steel components exposed to air – indoor is managed by the External Surfaces Monitoring, Fire Protection, and Periodic Surveillance and Preventive Maintenance Programs.<br>The External Surfaces Monitoring Program manages loss of material for external carbon steel components by visual inspection of external surfaces. For systems where internal carbon steel surfaces are exposed to the same environment as external surfaces, external surface conditions will be representative of internal surfaces. Thus, loss of material on internal carbon steel surfaces is also managed by the External Surfaces Monitoring Program.<br>The Fire Protection and Periodic Surveillance and Preventive Maintenance Programs manage loss of material of carbon steel components by periodic visual inspection of component internal surfaces. |

**Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.2.1-33 | Steel encapsulation components exposed to air – indoor uncontrolled (internal) | Loss of material due to general, pitting, and crevice corrosion | Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components | No | Not applicable. There are no steel encapsulation components in the ESF systems. |
| 3.2.1-34 | Steel piping, piping components, and piping elements exposed to condensation (internal) | Loss of material due to general, pitting, and crevice corrosion | Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components | No | Not applicable. There are no steel components exposed to internal condensation in the in-scope portions of the ESF systems. |
| 3.2.1-35 | Steel containment isolation piping and components internal surfaces exposed to raw water | Loss of material due to general, pitting, crevice, and microbiologically-influenced corrosion, and fouling | Open-Cycle Cooling Water System | No | Not applicable. There are no steel components exposed to raw water in the in-scope portions of the ESF systems. |
| 3.2.1-36 | 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 | No | Not applicable. There are no steel components exposed to raw water in the in-scope portions of the ESF systems. |

| Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1 | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 3.2.1-37 | Stainless steel 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 | No | The Periodic Surveillance and Preventive Maintenance Program manages loss of material for stainless steel components exposed to containment sump water which is considered raw water. The Periodic Surveillance and Preventive Maintenance Program will periodically visually inspect a representative sample of component surfaces exposed to containment sump water. |
| 3.2.1-38 | Stainless steel containment isolation piping and components internal surfaces exposed to raw water | Loss of material due to pitting, crevice, and microbiologically-influenced corrosion, and fouling | Open-Cycle Cooling Water System | No | Not applicable. There are no stainless steel containment isolation components exposed to raw water in the in scope portions of the ESF systems. |
| 3.2.1-39 | Stainless steel heat exchanger components exposed to raw water | Loss of material due to pitting, crevice, and microbiologically-influenced corrosion, and fouling | Open-Cycle Cooling Water System | No | Not applicable. There are no stainless steel heat exchanger components exposed to raw water in the ESF systems. |

**Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.2.1-40 | Steel and stainless steel heat exchanger tubes (serviced by open-cycle cooling water) exposed to raw water | Reduction of heat transfer due to fouling | Open-Cycle Cooling Water System | No | Not applicable. There are no steel or stainless steel heat exchanger components exposed to raw water in the ESF systems. |
| 3.2.1-41 | Copper alloy >15% Zn piping, piping components, piping elements, and heat exchanger components exposed to closed cycle cooling water | Loss of material due to selective leaching | Selective Leaching of Materials | No | Consistent with NUREG-1801. The Selective Leaching Program will manage loss of material due to selective leaching for copper alloy > 15% zinc components exposed to closed cycle cooling water. |
| 3.2.1-42 | Gray cast iron piping, piping components, piping elements exposed to closed-cycle cooling water | Loss of material due to selective leaching | Selective Leaching of Materials | No | Consistent with NUREG-1801. The Selective Leaching Program will manage loss of material due to selective leaching for gray cast iron components exposed to closed cycle cooling water. |
| 3.2.1-43 | Gray cast iron piping, piping components, and piping elements exposed to soil | Loss of material due to selective leaching | Selective Leaching of Materials | No | Not applicable. There are no buried gray cast iron components in the ESF systems. |

| **Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1** | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 3.2.1-44 | Gray cast iron motor cooler exposed to treated water | Loss of material due to selective leaching | Selective Leaching of Materials | No | Not applicable. There are no gray cast iron components exposed to treated water in the ESF systems. |
| 3.2.1-45 | Aluminum, copper alloy >15% Zn, and steel external surfaces, bolting, and piping, piping components, and piping elements exposed to air with borated water leakage | Loss of material due to Boric acid corrosion | Boric Acid Corrosion | No | Consistent with NUREG-1801. The Boric Acid Corrosion Prevention Program will manage loss of material for steel and copper alloy > 15% Zn components exposed to air with borated water leakage. There are no aluminum components exposed to air with borated water leakage in the ESF systems. |
| 3.2.1-46 | Steel encapsulation components exposed to air with borated water leakage (internal) | Loss of material due to general, pitting, crevice and boric acid corrosion | Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components | No | Not applicable. There are no steel encapsulation components internally exposed to air with borated water leakage in the ESF systems. |
| 3.2.1-47 | Cast austenitic stainless steel piping, piping components, and piping elements exposed to treated borated water >250°C (>482°F) | Loss of fracture toughness due to thermal aging embrittlement | Thermal Aging Embrittlement of CASS | No | Not applicable. There are no CASS components exposed to treated borated water > 482°F in the ESF systems. |

**Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.2.1-48 | Stainless steel or stainless-steel-clad steel piping, piping components, piping elements, and tanks (including safety injection tanks/ accumulators) exposed to treated borated water >60°C (>140°F) | Cracking due to stress corrosion cracking | Water Chemistry | No | Consistent with NUREG-1801. The Water Chemistry Control – Primary and Secondary Program manages cracking of stainless steel components exposed to treated borated water > 140°F. |
| 3.2.1-49 | Stainless steel piping, piping components, piping elements, and tanks exposed to treated borated water | Loss of material due to pitting and crevice corrosion | Water Chemistry | No | Consistent with NUREG-1801. The Water Chemistry Control – Primary and Secondary Program manages loss of material of stainless steel components exposed to treated borated water. |
| 3.2.1-50 | Aluminum piping, piping components, and piping elements exposed to air – indoor uncontrolled (internal/external) | None | None | NA - No AEM or AMP | Consistent with NUREG-1801. |

**Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.2.1-51 | Galvanized steel ducting exposed to air – indoor controlled (external) | None | None | NA - No AEM or AMP | Not applicable. Galvanized steel surfaces are evaluated as steel for the ESF systems. |
| 3.2.1-52 | Glass piping elements exposed to air – indoor uncontrolled (external), lubricating oil, raw water, treated water, or treated borated water | None | None | NA - No AEM or AMP | Consistent with NUREG-1801. The components to which this NUREG-1801 line item applies are in scope under criterion 10 CFR 54.4(a)(2), listed in series 3.3.2-19-xx tables. |
| 3.2.1-53 | Stainless steel, copper alloy, and nickel alloy piping, piping components, and piping elements exposed to air – indoor uncontrolled (external) | None | None | NA - No AEM or AMP | Consistent with NUREG-1801 for stainless steel and copper alloy components. There are no nickel alloy components exposed to air in the ESF systems. |
| 3.2.1-54 | Steel piping, piping components, and piping elements exposed to air – indoor controlled (external) | None | None | NA - No AEM or AMP | Not applicable. There are no steel components of the ESF systems in indoor controlled air environments. All indoor air environments are conservatively considered to be uncontrolled. |

**Table 3.2.1: Engineered Safety Features, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.2.1-55 | Steel and stainless steel piping, piping components, and piping elements in concrete | None | None | NA - No AEM or AMP | Consistent with NUREG-1801 for stainless steel components. There are no steel components in ESF systems embedded in concrete. |
| 3.2.1-56 | Steel, stainless steel, and copper alloy piping, piping components, and piping elements exposed to gas | None | None | NA - No AEM or AMP | Consistent with NUREG-1801. |
| 3.2.1-57 | Stainless steel and copper alloy <15% Zn piping, piping components, and piping elements exposed to air with borated water leakage | None | None | NA - No AEM or AMP | Consistent with NUREG-1801 for stainless steel components. There are no copper alloy components exposed to air with borated water leakage in the ESF systems. |

## Notes for Tables 3.2.2-1-IP2 through 3.2.2-5-IP3

### Generic Notes

A. Consistent with NUREG-1801 item for component, material, environment, aging effect and aging management program. AMP is consistent with NUREG-1801 AMP.

B. Consistent with NUREG-1801 item for component, material, environment, aging effect and aging management program. AMP has exceptions to NUREG-1801 AMP.

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

D. Component is different, but consistent with NUREG-1801 item for material, environment, aging effect and aging management program. AMP has exceptions to NUREG-1801 AMP.

E. Consistent with NUREG-1801 material, environment, and aging effect but a different aging management program is credited.

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.

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

J. Neither the component nor the material and environment combination is evaluated in NUREG-1801.

### Plant-Specific Notes

201. The air – treated environment is the equivalent of the NUREG-1801 defined dried air.

202. This treated water environment is water with sodium hydroxide.

203. This treated water environment is the equivalent of the NUREG-1801 defined closed cycle cooling water.

204. The containment sump suction line on IP3 utilizes a “mini-containment” consisting of guard piping and encapsulation of the containment outboard isolation valve. The air pressure internal to the “mini-containment” is maintained above the pressure internal to the RHR components by instrument air.

205. Not used.

206. The One-Time Inspection Program will verify effectiveness of the Water Chemistry Control – Primary and Secondary Program.

207. The raw water environment conservatively represents water collected in the containment sump.

208. The One-Time Inspection Program will verify effectiveness of the Oil Analysis Program.

## Table 3.2.2-1-IP2
## Residual Heat Removal System
## Summary of Aging Management Review

**Table 3.2.2-1-IP2: Residual Heat Removal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Bolting | Pressure boundary | Stainless steel | Raw water (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | V.D1-25<br>(EP-55) | 3.2.1-37 | E, 207 |
| Flex hose | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Flex hose | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Flex hose | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Flex hose | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |

**Table 3.2.2-1-IP2: Residual Heat Removal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-6<br>(E-17) | 3.2.1-27 | B |
| Heat exchanger (tubes) | Heat transfer | Stainless steel | Treated borated water > 140°F (int) | Fouling | Water Chemistry Control – Primary and Secondary | -- | -- | G |
| Heat exchanger (tubes) | Heat transfer | Stainless steel | Treated water (ext) | Fouling | Water Chemistry Control – Closed Cooling Water | V.D1-9<br>(EP-35) | 3.2.1-30 | B |

| Table 3.2.2-1-IP2: Residual Heat Removal System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | C |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | C |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-4<br>(E-19) | 3.2.1-28 | B |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material – wear | Heat Exchanger Monitoring | -- | -- | H |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Piping | Pressure boundary | Stainless steel | Concrete (ext) | None | None | V.F-14<br>(EP-20) | 3.2.1-55 | A |
| Piping | Pressure boundary | Stainless steel | Raw water (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | V.D1-25<br>(EP-55) | 3.2.1-37 | E, 207 |
| Piping | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | V.D1-25<br>(EP-55) | 3.2.1-37 | E, 207 |

**Table 3.2.2-1-IP2: Residual Heat Removal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Thermowell | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Thermowell | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |

**Table 3.2.2-1-IP2: Residual Heat Removal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Valve body | Pressure boundary | Stainless steel | Raw water (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | V.D1-25<br>(EP-55) | 3.2.1-37 | E, 207 |
| Valve body | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | V.D1-25<br>(EP-55) | 3.2.1-37 | E, 207 |

| Table 3.2.2-1-IP2: Residual Heat Removal System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |

# Table 3.2.2-1-IP3
# Residual Heat Removal System
# Summary of Aging Management Review

**Table 3.2.2-1-IP3: Residual Heat Removal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Bolting | Pressure boundary | Stainless steel | Raw water (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | V.D1-25<br>(EP-55) | 3.2.1-37 | E, 207 |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |

**Table 3.2.2-1-IP3: Residual Heat Removal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-6<br>(E-17) | 3.2.1-27 | B |
| Heat exchanger (tubes) | Heat transfer | Stainless steel | Treated borated water > 140°F (int) | Fouling | Water Chemistry Control – Primary and Secondary | -- | -- | G |
| Heat exchanger (tubes) | Heat transfer | Stainless steel | Treated water (ext) | Fouling | Water Chemistry Control – Closed Cooling Water | V.D1-9<br>(EP-35) | 3.2.1-30 | B |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | C |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | C |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-4<br>(E-19) | 3.2.1-28 | B |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material – wear | Heat Exchanger Monitoring | -- | -- | H |

**Table 3.2.2-1-IP3: Residual Heat Removal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Piping | Pressure boundary | Stainless steel | Air – treated (ext) | None | None | VII.J-18<br>(AP-20) | 3.3.1-98 | C, 204 |
| Piping | Pressure boundary | Stainless steel | Concrete (ext) | None | None | V.F-14<br>(EP-20) | 3.2.1-55 | A |
| Piping | Pressure boundary | Stainless steel | Raw water (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | V.D1-25<br>(EP-55) | 3.2.1-37 | E, 207 |
| Piping | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | V.D1-25<br>(EP-55) | 3.2.1-37 | E, 207 |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |

**Table 3.2.2-1-IP3: Residual Heat Removal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Pump casing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Strainer housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Strainer housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Strainer housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Strainer housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Thermowell | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Thermowell | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |

**Table 3.2.2-1-IP3: Residual Heat Removal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30 (EP-41) | 3.2.1-49 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13 (EP-19) | 3.2.1-57 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31 (E-12) | 3.2.1-48 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27 (E-13) | 3.2.1-1 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30 (EP-41) | 3.2.1-49 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13 (EP-19) | 3.2.1-57 | A |
| Valve body | Pressure boundary | Stainless steel | Air – treated (ext) | None | None | VII.J-18 (AP-20) | 3.3.1-98 | C, 204 |
| Valve body | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | V.D1-25 (EP-55) | 3.2.1-37 | E, 207 |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30 (EP-41) | 3.2.1-49 | A |

**Table 3.2.2-1-IP3: Residual Heat Removal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |

# Table 3.2.2-2-IP2
# Containment Spray System
# Summary of Aging Management Review

**Table 3.2.2-2-IP2: Containment Spray System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | C |
| Bolting | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | -- | -- | G |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Nozzle | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Nozzle | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |

**Table 3.2.2-2-IP2: Containment Spray System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | A |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | A |
| Strainer housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Strainer housing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |

**Table 3.2.2-2-IP2: Containment Spray System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | A |

# Table 3.2.2-2-IP3
# Containment Spray System
# Summary of Aging Management Review

**Table 3.2.2-2-IP3: Containment Spray System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | C |
| Bolting | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | -- | -- | G |
| Eductor | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Eductor | Pressure boundary<br>Flow control | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | A |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |

**Table 3.2.2-2-IP3: Containment Spray System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flow element | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | -- | -- | G, 202 |
| Flow element | Pressure boundary | Stainless steel | Treated water (int) | Cracking | Water Chemistry Control – Auxiliary Systems | -- | -- | G, 202 |
| Nozzle | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Nozzle | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | V.D1-26<br>(EP-31) | 3.2.1-4 | E |
| Piping | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | A |

**Table 3.2.2-2-IP3: Containment Spray System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Cracking | Water Chemistry Control – Auxiliary Systems | -- | -- | G, 202 |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | -- | -- | G, 202 |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | A |
| Tank | Pressure boundary | Carbon steel with stainless cladding | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Tank | Pressure boundary | Carbon steel with stainless cladding | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.D1-1<br>(E-28) | 3.2.1-45 | C |
| Tank | Pressure boundary | Carbon steel with stainless cladding | Treated water (int) | Cracking | Water Chemistry Control – Auxiliary Systems | -- | -- | G, 202 |
| Tank | Pressure boundary | Carbon steel with stainless cladding | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | -- | -- | G, 202 |

**Table 3.2.2-2-IP3: Containment Spray System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tank | Pressure boundary | Carbon steel with stainless cladding | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 202 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | -- | -- | G, 202 |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Cracking | Water Chemistry Control – Auxiliary Systems | -- | -- | G, 202 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Valve body | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | A |

**Table 3.2.2-2-IP3: Containment Spray System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | -- | -- | G, 202 |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Cracking | Water Chemistry Control – Auxiliary Systems | -- | -- | G, 202 |

# Table 3.2.2-3-IP2
# Containment Isolation Support Systems
# Summary of Aging Management Review

| Table 3.2.2-3-IP2: Containment Isolation Support Systems | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Filter housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Filter housing | Pressure boundary | Stainless steel | Gas (int) | None | None | V.F-15<br>(EP-22) | 3.2.1-56 | A |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Flow element | Pressure boundary<br>Flow control | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Flow element | Pressure boundary<br>Flow control | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | C, 201 |
| Flow element | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |

| **Table 3.2.2-3-IP2: Containment Isolation Support Systems** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Flow element | Pressure boundary<br>Flow control | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | C, 206 |
| Indicator | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Indicator | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | C, 206 |
| Instrument | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Instrument | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | C, 206 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Piping | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | C, 201 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | C, 206 |

| Table 3.2.2-3-IP2:  Containment Isolation Support Systems | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Tank | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | C, 201 |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Tank | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | C, 206 |
| Tubing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Tubing | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | C, 201 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Tubing | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18<br>(AP-20) | 3.3.1-98 | C |
| Tubing | Pressure boundary | Stainless steel | Gas (int) | None | None | V.F-15<br>(EP-22) | 3.2.1-56 | A |

| **Table 3.2.2-3-IP2: Containment Isolation Support Systems** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | C, 206 |
| Valve body | Pressure boundary | Aluminum | Air – indoor (ext) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | A |
| Valve body | Pressure boundary | Aluminum | Gas (int) | None | None | VII.J-2<br>(AP-37) | 3.3.1-97 | C |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Valve body | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | C, 201 |
| Valve body | Pressure boundary | Carbon steel | Gas (int) | None | None | V.F-18<br>(EP-7) | 3.2.1-56 | A |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | A |
| Valve body | Pressure boundary | Copper alloy | Air – treated (int) | None | None | VII.J-3<br>(AP-8) | 3.3.1-98 | C, 201 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | A |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – treated (int) | None | None | VII.J-3<br>(AP-8) | 3.3.1-98 | C, 201 |

**Table 3.2.2-3-IP2: Containment Isolation Support Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Gas (int) | None | None | V.F-4<br>(EP-9) | 3.2.1-56 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Valve body | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18<br>(AP-20) | 3.3.1-98 | C |
| Valve body | Pressure boundary | Stainless steel | Gas (int) | None | None | V.F-15<br>(EP-22) | 3.2.1-56 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | C, 206 |

# Table 3.2.2-3-IP3
# Containment Isolation Support Systems
# Summary of Aging Management Review

**Table 3.2.2-3-IP3: Containment Isolation Support Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Filter | Filtration | Carbon steel | Gas (int) | None | None | V.F-18<br>(EP-7) | 3.2.1-56 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Flow element | Pressure boundary<br>Flow control | Carbon steel with stainless cladding | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Flow element | Pressure boundary<br>Flow control | Carbon steel with stainless cladding | Air – treated (int) | None | None | VII.J-18<br>(AP-20) | 3.3.1-98 | C, 201 |
| Indicator | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Indicator | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | C, 206 |

**Table 3.2.2-3-IP3: Containment Isolation Support Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Piping | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | C, 201 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | C, 206 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Tank | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | C, 201 |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Tank | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | C, 206 |
| Tubing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |

**Table 3.2.2-3-IP3: Containment Isolation Support Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | C, 201 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Tubing | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18<br>(AP-20) | 3.3.1-98 | C |
| Tubing | Pressure boundary | Stainless steel | Gas (int) | None | None | V.F-15<br>(EP-22) | 3.2.1-56 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | C, 206 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Valve body | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | C, 201 |
| Valve body | Pressure boundary | Carbon steel | Gas (int) | None | None | V.F-18<br>(EP-7) | 3.2.1-56 | A |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | A |
| Valve body | Pressure boundary | Copper alloy | Air – treated (int) | None | None | VII.J-3<br>(AP-8) | 3.3.1-98 | C, 201 |

**Table 3.2.2-3-IP3: Containment Isolation Support Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-5<br>(SP-61) | 3.4.1-15 | C, 206 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | A |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – treated (int) | None | None | VII.J-3<br>(AP-8) | 3.3.1-98 | C, 201 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Valve body | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18<br>(AP-20) | 3.3.1-98 | C |
| Valve body | Pressure boundary | Stainless steel | Gas (int) | None | None | V.F-15<br>(EP-22) | 3.2.1-56 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | C, 206 |

# Table 3.2.2-4-IP2
# Safety Injection Systems
# Summary of Aging Management Review

**Table 3.2.2-4-IP2: Safety Injection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | V.E-1<br>(EP-1) | 3.2.1-23 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | C |
| Bolting | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | -- | -- | G |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |

**Table 3.2.2-4-IP2: Safety Injection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flow element | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Flow element | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Flow element | Pressure boundary<br>Flow control | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Heat exchanger (bonnet) | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.D1-1<br>(E-28) | 3.2.1-45 | A |
| Heat exchanger (bonnet) | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Heat exchanger (bonnet) | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | V.D1-20<br>(EP-52) | 3.2.1-42 | C, 203 |

**Table 3.2.2-4-IP2: Safety Injection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (bonnet) | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-6<br>(E-17) | 3.2.1-27 | B |
| Heat exchanger (housing) | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.D1-1<br>(E-28) | 3.2.1-45 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-6<br>(E-17) | 3.2.1-27 | B |
| Heat exchanger (shell) | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-11<br>(EP-38) | 3.2.1-45 | C |
| Heat exchanger (shell) | Pressure boundary | Copper alloy > 15% Zn | Lube oil (int) | Loss of material | Oil Analysis | V.D1-18<br>(EP-45) | 3.2.1-6 | B, 208 |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Air – indoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |

| Table 3.2.2-4-IP2: Safety Injection Systems | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Lube oil (ext) | Fouling | Oil Analysis | V.D1-8<br>(EP-47) | 3.2.1-9 | B, 208 |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Treated water (int) | Fouling | Water Chemistry Control – Closed Cooling Water | V.A-11<br>(EP-39) | 3.2.1-30 | D |
| Heat exchanger (tubes) | Heat transfer | Stainless steel | Treated borated water (int) | Fouling | Water Chemistry Control – Primary and Secondary | -- | -- | G |
| Heat exchanger (tubes) | Heat transfer | Stainless steel | Treated water (ext) | Fouling | Water Chemistry Control – Closed Cooling Water | V.D1-9<br>(EP-35) | 3.2.1-30 | B |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Lube oil (ext) | Loss of material | Oil Analysis | V.D1-18<br>(EP-45) | 3.2.1-6 | B, 208 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Lube oil (ext) | Loss of material – wear | Heat Exchanger Monitoring | -- | -- | H |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-2<br>(EP-13) | 3.2.1-29 | B |

| **Table 3.2.2-4-IP2: Safety Injection Systems** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | C |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-4<br>(E-19) | 3.2.1-28 | B |
| Heat exchanger (tubesheet) | Pressure boundary | Copper alloy > 15% Zn | Lube oil (int) | Loss of material | Oil Analysis | V.D1-18<br>(EP-45) | 3.2.1-6 | B, 208 |
| Heat exchanger (tubesheet) | Pressure boundary | Copper alloy > 15% Zn | Treated water (ext) | Loss of material | Selective Leaching | V.D1-3<br>(EP-37) | 3.2.1-41 | A, 203 |
| Heat exchanger (tubesheet) | Pressure boundary | Copper alloy > 15% Zn | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-2<br>(EP-13) | 3.2.1-29 | B |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Piping | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.D1-28<br>(EP-46) | 3.2.1-16 | B, 208 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |

**Table 3.2.2-4-IP2: Safety Injection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Concrete (ext) | None | None | V.F-14<br>(EP-20) | 3.2.1-55 | A |
| Piping | Pressure boundary | Stainless steel | Gas (int) | None | None | V.F-15<br>(EP-22) | 3.2.1-56 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Piping | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |

| **Table 3.2.2-4-IP2: Safety Injection Systems** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-22<br>(EP-33) | 3.2.1-28 | B |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Pump casing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.D1-28<br>(EP-46) | 3.2.1-16 | B, 208 |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-22<br>(EP-33) | 3.2.1-28 | B |
| Seal jacket cooler | Heat transfer | Stainless steel | Treated water (int) | Fouling | Water Chemistry Control – Closed Cooling Water | V.D1-9<br>(EP-35) | 3.2.1-30 | B |
| Seal jacket cooler | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |

**Table 3.2.2-4-IP2: Safety Injection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Seal jacket cooler | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-22<br>(EP-33) | 3.2.1-28 | B |
| Tank | Pressure boundary | Carbon steel with stainless cladding | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.D1-1<br>(E-28) | 3.2.1-45 | A |
| Tank | Pressure boundary | Carbon steel with stainless cladding | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Tank | Pressure boundary | Carbon steel with stainless cladding | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Tank | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Tank | Pressure boundary | Stainless steel | Concrete (ext) | None | None | V.F-14<br>(EP-20) | 3.2.1-55 | A |
| Tank | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | V.D1-24<br>(EP-51) | 3.2.1-6 | B, 208 |
| Tank | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |

**Table 3.2.2-4-IP2: Safety Injection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Thermowell | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Tubing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.D1-28<br>(EP-46) | 3.2.1-16 | B, 208 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Gas (int) | None | None | V.F-15<br>(EP-22) | 3.2.1-56 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |

| **Table 3.2.2-4-IP2: Safety Injection Systems** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-22<br>(EP-33) | 3.2.1-28 | B |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.D1-28<br>(EP-46) | 3.2.1-16 | B, 208 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Gas (int) | None | None | V.F-15<br>(EP-22) | 3.2.1-56 | A |

**Table 3.2.2-4-IP2: Safety Injection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |

# Table 3.2.2-4-IP3
# Safety Injection Systems
# Summary of Aging Management Review

**Table 3.2.2-4-IP3: Safety Injection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | V.E-1<br>(EP-1) | 3.2.1-23 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | C |
| Bolting | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | -- | -- | G |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |

**Table 3.2.2-4-IP3: Safety Injection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flow element | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Flow element | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Flow element | Pressure boundary<br>Flow control | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Heat exchanger (bonnet) | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.D1-1<br>(E-28) | 3.2.1-45 | A |
| Heat exchanger (bonnet) | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Heat exchanger (bonnet) | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | V.D1-20<br>(EP-52) | 3.2.1-42 | C, 203 |

**Table 3.2.2-4-IP3: Safety Injection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (bonnet) | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-6<br>(E-17) | 3.2.1-27 | B |
| Heat exchanger (housing) | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.D1-1<br>(E-28) | 3.2.1-45 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-6<br>(E-17) | 3.2.1-27 | B |
| Heat exchanger (shell) | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E1-11<br>(EP-38) | 3.2.1-45 | C |
| Heat exchanger (shell) | Pressure boundary | Copper alloy > 15% Zn | Lube oil (int) | Loss of material | Oil Analysis | V.D1-18<br>(EP-45) | 3.2.1-6 | B, 208 |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Air – indoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |

**Table 3.2.2-4-IP3: Safety Injection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Lube oil (ext) | Fouling | Oil Analysis | V.D1-8<br>(EP-47) | 3.2.1-9 | B, 208 |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Treated water (int) | Fouling | Water Chemistry Control – Closed Cooling Water | V.A-11<br>(EP-39) | 3.2.1-30 | D |
| Heat exchanger (tubes) | Heat transfer | Stainless steel | Treated borated water (int) | Fouling | Water Chemistry Control – Primary and Secondary | -- | -- | G |
| Heat exchanger (tubes) | Heat transfer | Stainless steel | Treated water (ext) | Fouling | Water Chemistry Control – Closed Cooling Water | V.D1-9<br>(EP-35) | 3.2.1-30 | B |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Lube oil (ext) | Loss of material | Oil Analysis | V.D1-18<br>(EP-45) | 3.2.1-6 | B, 208 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Lube oil (ext) | Loss of material – wear | Heat Exchanger Monitoring | -- | -- | H |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-2<br>(EP-13) | 3.2.1-29 | B |

**Table 3.2.2-4-IP3: Safety Injection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | C |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-4<br>(E-19) | 3.2.1-28 | B |
| Heat exchanger (tubesheet) | Pressure boundary | Copper alloy > 15% Zn | Lube oil (int) | Loss of material | Oil Analysis | V.D1-18<br>(EP-45) | 3.2.1-6 | B, 208 |
| Heat exchanger (tubesheet) | Pressure boundary | Copper alloy > 15% Zn | Treated water (ext) | Loss of material | Selective Leaching | V.D1-3<br>(EP-37) | 3.2.1-41 | A, 203 |
| Heat exchanger (tubesheet) | Pressure boundary | Copper alloy > 15% Zn | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-2<br>(EP-13) | 3.2.1-29 | B |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Piping | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.D1-28<br>(EP-46) | 3.2.1-16 | B, 208 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |

**Table 3.2.2-4-IP3: Safety Injection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Concrete (ext) | None | None | V.F-14 (EP-20) | 3.2.1-55 | A |
| Piping | Pressure boundary | Stainless steel | Gas (int) | None | None | V.F-15 (EP-22) | 3.2.1-56 | A |
| Piping | Pressure boundary | Stainless steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | V.D1-26 (EP-31) | 3.2.1-4 | E |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10 (SP-44) | 3.4.1-39 | C |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12 (SP-43) | 3.4.1-37 | C |
| Piping | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30 (EP-41) | 3.2.1-49 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31 (E-12) | 3.2.1-48 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27 (E-13) | 3.2.1-1 | A |

| **Table 3.2.2-4-IP3: Safety Injection Systems** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-22<br>(EP-33) | 3.2.1-28 | B |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Pump casing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.D1-28<br>(EP-46) | 3.2.1-16 | B, 208 |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-22<br>(EP-33) | 3.2.1-28 | B |
| Seal jacket cooler | Heat transfer | Stainless steel | Treated water (int) | Fouling | Water Chemistry Control – Closed Cooling Water | V.D1-9<br>(EP-35) | 3.2.1-30 | B |
| Seal jacket cooler | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |

**Table 3.2.2-4-IP3: Safety Injection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Seal jacket cooler | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-22<br>(EP-33) | 3.2.1-28 | B |
| Tank | Pressure boundary | Carbon steel with stainless cladding | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.D1-1<br>(E-28) | 3.2.1-45 | A |
| Tank | Pressure boundary | Carbon steel with stainless cladding | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Tank | Pressure boundary | Carbon steel with stainless cladding | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Tank | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Tank | Pressure boundary | Stainless steel | Concrete (ext) | None | None | V.F-14<br>(EP-20) | 3.2.1-55 | A |
| Tank | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | V.D1-24<br>(EP-51) | 3.2.1-6 | B, 208 |
| Tank | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |

**Table 3.2.2-4-IP3: Safety Injection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Thermowell | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Tubing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.D1-28<br>(EP-46) | 3.2.1-16 | B, 208 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Gas (int) | None | None | V.F-15<br>(EP-22) | 3.2.1-56 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |

| Table 3.2.2-4-IP3: Safety Injection Systems | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | V.D1-22<br>(EP-33) | 3.2.1-28 | B |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.D1-28<br>(EP-46) | 3.2.1-16 | B, 208 |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Valve body | Pressure boundary | CASS | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |

**Table 3.2.2-4-IP3: Safety Injection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Gas (int) | None | None | V.F-15<br>(EP-22) | 3.2.1-56 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.D1-31<br>(E-12) | 3.2.1-48 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |

# Table 3.2.2-5-IP2
# Containment Penetrations
# Summary of Aging Management Review

| Table 3.2.2-5-IP2: Containment Penetrations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.C-1<br>(E-35) | 3.2.1-31 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Piping | Pressure boundary | Carbon steel | Gas (int) | None | None | V.F-18<br>(EP-7) | 3.2.1-56 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-6<br>(E-31) | 3.2.1-15 | A, 206 |

**Table 3.2.2-5-IP2: Containment Penetrations**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | A |
| Piping | Pressure boundary | Copper alloy | Air – indoor (int) | None | None | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | V.A-26<br>(EP-53) | 3.2.1-8 | E |
| Piping | Pressure boundary | Stainless steel | Gas (int) | None | None | V.F-15<br>(EP-22) | 3.2.1-56 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | A, 206 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.C-1<br>(E-35) | 3.2.1-31 | A |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Regulator | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |

**Table 3.2.2-5-IP2: Containment Penetrations**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Regulator | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Sampler housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Sampler housing | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | A, 206 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.C-1<br>(E-35) | 3.2.1-31 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Valve body | Pressure boundary | Carbon steel | Gas (int) | None | None | V.F-18<br>(EP-7) | 3.2.1-56 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-6<br>(E-31) | 3.2.1-15 | A, 206 |

**Table 3.2.2-5-IP2: Containment Penetrations**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | V.A-26<br>(EP-53) | 3.2.1-8 | E |
| Valve body | Pressure boundary | Stainless steel | Gas (int) | None | None | V.F-15<br>(EP-22) | 3.2.1-56 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | A, 206 |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |

# Table 3.2.2-5-IP3
# Containment Penetrations
# Summary of Aging Management Review

| Table 3.2.2-5-IP3: Containment Penetrations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.C-1<br>(E-35) | 3.2.1-31 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-6<br>(E-31) | 3.2.1-15 | A, 206 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | V.A-26<br>(EP-53) | 3.2.1-8 | E |

| Table 3.2.2-5-IP3: Containment Penetrations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Stainless steel | Gas (int) | None | None | V.F-15<br>(EP-22) | 3.2.1-56 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | A, 206 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.C-1<br>(E-35) | 3.2.1-31 | A |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | A, 206 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.C-1<br>(E-35) | 3.2.1-31 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-6<br>(E-31) | 3.2.1-15 | A, 206 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |

| **Table 3.2.2-5-IP3: Containment Penetrations** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | V.A-26<br>(EP-53) | 3.2.1-8 | E |
| Valve body | Pressure boundary | Stainless steel | Gas (int) | None | None | V.F-15<br>(EP-22) | 3.2.1-56 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | A, 206 |

# 3.3 AUXILIARY SYSTEMS

## 3.3.1 Introduction

This section provides the results of the aging management reviews for those components in the auxiliary systems which are subject to aging management review. The following systems are addressed in this section (system descriptions are available in the referenced sections).

- Spent Fuel Pit Cooling (Section 2.3.3.1)
- Service Water (Section 2.3.3.2)
- Component Cooling Water (Section 2.3.3.3)
- Compressed Air (Section 2.3.3.4)
- Nitrogen (Section 2.3.3.5)
- Chemical and Volume Control (Section 2.3.3.6)
- Primary Makeup Water (Section 2.3.3.7)
- Heating, Ventilation and Air Conditioning (Section 2.3.3.8)
- Containment Cooling and Filtration (Section 2.3.3.9)
- Control Room HVAC (Section 2.3.3.10)
- Fire Protection – Water (Section 2.3.3.11)
- Fire Protection – CO2, Halon, and RCP Oil Collection Systems (Section 2.3.3.12)
- Fuel Oil (Section 2.3.3.13)
- Emergency Diesel Generator (Section 2.3.3.14)
- Security Generator (Section 2.3.3.15)
- Appendix R Diesel Generators (Section 2.3.3.16)
- City Water (Section 2.3.3.17)
- Plant Drains (Section 2.3.3.18)
- Miscellaneous Systems in Scope for 10 CFR 54.4(a)(2) (Section 2.3.3.19)

Table 3.3.1, Summary of Aging Management Programs for Auxiliary Systems Evaluated in Chapter VII of NUREG-1801, provides the summary of the programs evaluated in NUREG-1801 for the auxiliary systems component group. This table uses the format described in the introduction to Section 3. Hyperlinks are provided to the program evaluations in Appendix B.

## 3.3.2 Results

The following system tables summarize the results of aging management reviews and the NUREG-1801 comparison for auxiliary systems.

| | |
|---|---|
| • Table 3.3.2-1-IP2 | Spent Fuel Pit Cooling System—Summary of Aging Management Review |
| • Table 3.3.2-1-IP3 | Spent Fuel Pit Cooling System—Summary of Aging Management Review |
| • Table 3.3.2-2-IP2 | Service Water System—Summary of Aging Management Review |

- Table 3.3.2-10-IP3 Control Room HVAC System—Summary of Aging Management Review
- Table 3.3.2-11-IP2 Fire Protection – Water System—Summary of Aging Management Review
- Table 3.3.2-11-IP3 Fire Protection – Water System—Summary of Aging Management Review
- Table 3.3.2-12-IP2 Fire Protection – $CO_2$, Halon, and RCP Oil Collection Systems—Summary of Aging Management Review
- Table 3.3.2-12-IP3 Fire Protection – $CO_2$, Halon, and RCP Oil Collection Systems—Summary of Aging Management Review
- Table 3.3.2-13-IP2 Fuel Oil System—Summary of Aging Management Review
- Table 3.3.2-13-IP3 Fuel Oil System—Summary of Aging Management Review
- Table 3.3.2-14-IP2 Emergency Diesel Generator System—Summary of Aging Management Review
- Table 3.3.2-14-IP3 Emergency Diesel Generator System—Summary of Aging Management Review
- Table 3.3.2-15-IP2 Security Generator System—Summary of Aging Management Review
- Table 3.3.2-15-IP3 Security Generator System—Summary of Aging Management Review
- Table 3.3.2-16-IP2 SBO/Appendix R Diesel Generator System—Summary of Aging Management Review
- Table 3.3.2-16-IP3 Appendix R Diesel Generator System—Summary of Aging Management Review
- Table 3.3.2-17-IP2 City Water System—Summary of Aging Management Review
- Table 3.3.2-17-IP3 City Water System—Summary of Aging Management Review
- Table 3.3.2-18-IP2 Plant Drains—Summary of Aging Management Review
- Table 3.3.2-18-IP3 Plant Drains—Summary of Aging Management Review

### *Miscellaneous Systems in Scope for 10 CFR 54.4(a)(2)*

*Unit 2*

- Table 3.3.2-19-1-IP2 Auxiliary Steam System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-2-IP2 Conventional Closed Cooling System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-3-IP2 Chemical Feed System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-4-IP2 Condensate System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-5-IP2 Chemical and Volume Control System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-6-IP2 Circulating Water System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-7-IP2 City Water System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-8-IP2 Intake Structure System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-9-IP2 Emergency Diesel Generator System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-10-IP2 Fuel Oil System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review

| | |
|---|---|
| • Table 3.3.2-19-11-IP2 | Fire Protection System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-12-IP2 | Feedwater System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-13-IP2 | Fresh Water Cooling System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-14-IP2 | Gas System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-15-IP2 | Main Generator System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-16-IP2 | House Service Boiler System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-17-IP2 | Heating, Ventilation and Air Conditioning System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-18-IP2 | Instrument Air System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-19-IP2 | Instrument Air Closed Cooling System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-20-IP2 | Ignition Oil System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-21-IP2 | Integrated Liquid Waste Handling System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |

- Table 3.3.2-19-22-IP2 Lube Oil System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-23-IP2 Main Steam System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-24-IP2 Miscellaneous System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-25-IP2 Nuclear Service Grade Makeup System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-26-IP2 Post-Accident Containment Air Sample System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-27-IP2 Post-Accident Containment Air Vent System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-28-IP2 Primary Sampling System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-29-IP2 Primary Water Makeup System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-30-IP2 Reactor Coolant System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-31-IP2 Radiation Monitoring System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-32-IP2 River Water Service System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review

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- Table 3.3.2-19-1-IP3 Ammonia / Morpholine Addition System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-2-IP3 Auxiliary Steam and Condensate Return System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-3-IP3 Boron and Layup Chemical Addition System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-4-IP3 Condenser Air Removal System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
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- Table 3.3.2-19-7-IP3 Condensate Polisher System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-8-IP3 Condensate Pump Discharge System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-9-IP3 Condensate Pump Suction System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-10-IP3 Containment Spray System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review

- Table 3.3.2-19-11-IP3 Chemical and Volume Control System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-12-IP3 Circulating Water System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-13-IP3 City Water Makeup System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-14-IP3 Condensate Transfer System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-15-IP3 Demineralized Water System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-16-IP3 Emergency Diesel Generator System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-17-IP3 Emergency Generators System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-18-IP3 Extraction Steam System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-19-IP3 Floor Drains, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-20-IP3 Fire Water System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-21-IP3 Fuel Storage Building HVAC System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review

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| • Table 3.3.2-19-22-IP3 | Feedwater System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-23-IP3 | Main Feedwater Pump and Services, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-24-IP3 | Gland Seal Steam System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-25-IP3 | Gaseous Waste Disposal System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-26-IP3 | Hydrazine Addition System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-27-IP3 | Heater Drain / Moisture Separator Drains / Vents System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-28-IP3 | High Pressure Steam Dump System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-29-IP3 | Instrument Air System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-30-IP3 | Instrument Air Closed Cooling System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-31-IP3 | Lube Oil System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-32-IP3 | Low Pressure Steam Dump System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |

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| • Table 3.3.2-19-33-IP3 | Liquid Waste Disposal System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-34-IP3 | Main Feedwater System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-35-IP3 | Main Steam System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-36-IP3 | Main Turbine Generator System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-37-IP3 | Nitrogen System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-38-IP3 | Nuclear Equipment Drains System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-39-IP3 | Primary Auxiliary Building HVAC System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-40-IP3 | Process Radiation Monitoring System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-41-IP3 | Primary Plant Sampling System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-42-IP3 | Primary Water Makeup System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |
| • Table 3.3.2-19-43-IP3 | Pressurizer System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review |

- Table 3.3.2-19-44-IP3 Reactor Coolant System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-45-IP3 Reheat Steam System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-46-IP3 Reactor Vessel Level Indication System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-47-IP3 River Water Service System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-48-IP3 Station Air System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-49-IP3 Spent Fuel Pit and Cooling System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-50-IP3 Steam Generator Blowdown System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-51-IP3 Steam Generator Blowdown Recovery System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-52-IP3 Steam Generator Sampling System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-53-IP3 Safety Injection / Recirculation System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-54-IP3 Main Generator Seal Oil System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review

- Table 3.3.2-19-55-IP3 Secondary Plant Sampling System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-56-IP3 Service Water System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-57-IP3 Turbine Generator Hydraulic Control System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
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- Table 3.3.2-19-59-IP3 Vapor Containment Hydrogen Analyzer System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-60-IP3 Vapor containment Purge and Supply System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-61-IP3 Vapor Containment Pressure Relief System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review
- Table 3.3.2-19-62-IP3 Weld Channel and Containment Penetration Pressurization System, Nonsafety-Related Components Potentially Affecting Safety Functions—Summary of Aging Management Review

### 3.3.2.1 Materials, Environments, Aging Effects Requiring Management and Aging Management Programs

The following sections list the materials, environments, aging effects requiring management, and aging management programs for the auxiliary systems. Programs are described in Appendix B. Further details are provided in the system tables.

#### 3.3.2.1.1 Spent Fuel Pit Cooling

**Materials**

Spent fuel pit cooling system components are constructed of the following materials.

- boron carbide / elastomer (Boraflex)
- boron carbide / aluminum powder clad in aluminum (Boral)

**Environment**

Spent fuel pit cooling system components are exposed to the following environments.

- treated borated water

**Aging Effects Requiring Management**

The following aging effects associated with the spent fuel pit cooling system require management.

- change in material properties
- cracking
- loss of material

**Aging Management Programs**

The following aging management programs manage the aging effects for the spent fuel pit cooling system components.

- Boraflex Monitoring
- Boral Surveillance
- Water Chemistry Control – Primary and Secondary

#### 3.3.2.1.2 Service Water

**Materials**

Service water system components are constructed of the following materials.

- carbon steel

- copper alloy
- copper alloy > 15% zinc
- copper alloy > 15% zinc (inhibited)
- glass
- gray cast iron
- nickel alloy
- stainless steel
- titanium

### Environment

Service water system components are exposed to the following environments.

- condensation
- raw water
- soil
- treated water

### Aging Effects Requiring Management

The following aging effects associated with the service water system require management.

- cracking
- fouling
- loss of material
- loss of material – wear

### Aging Management Programs

The following aging management programs manage the aging effects for the service water system components.

- Bolting Integrity
- Buried Piping and Tanks Inspection
- External Surfaces Monitoring
- Heat Exchanger Monitoring
- Selective Leaching
- Service Water Integrity
- Water Chemistry Control – Closed Cooling Water
- Water Chemistry Control – Primary and Secondary

### 3.3.2.1.3 Component Cooling Water

**Materials**

Component cooling water system components are constructed of the following materials.

- aluminum bronze
- carbon steel
- cast austenitic stainless steel (CASS)
- copper alloy
- copper alloy > 15% zinc (inhibited)
- gray cast iron
- stainless steel

**Environment**

Component cooling water system components are exposed to the following environments.

- air – indoor
- condensation
- raw water
- treated borated water
- treated borated water > 140°F
- treated water
- treated water > 140°F

**Aging Effects Requiring Management**

The following aging effects associated with the component cooling water system require management.

- cracking
- cracking – fatigue
- fouling
- loss of material
- loss of material – wear

**Aging Management Programs**

The following aging management programs manage the aging effects for the component cooling water system components.

- Bolting Integrity
- Boric Acid Corrosion Prevention

- External Surfaces Monitoring
- Heat Exchanger Monitoring
- Selective Leaching
- Service Water Integrity
- Water Chemistry Control – Closed Cooling Water
- Water Chemistry Control – Primary and Secondary

### 3.3.2.1.4 Compressed Air

**Materials**

Compressed air system components are constructed of the following materials.

- aluminum
- carbon steel
- copper alloy
- copper alloy > 15% zinc
- stainless steel

**Environment**

Compressed air system components are exposed to the following environments.

- air – indoor
- air – treated
- condensation

**Aging Effects Requiring Management**

The following aging effects associated with the compressed air system require management.

- loss of material

**Aging Management Programs**

The following aging management programs manage the aging effects for the compressed air system components.

- Bolting Integrity
- External Surfaces Monitoring
- One-Time Inspection
- Periodic Surveillance and Preventive Maintenance

### 3.3.2.1.5 Nitrogen

**Materials**

Nitrogen system components are constructed of the following materials.

- carbon steel
- copper alloy
- copper alloy > 15% zinc
- stainless steel

**Environment**

Nitrogen system components are exposed to the following environments.

- air – indoor
- gas

**Aging Effects Requiring Management**

The following aging effects associated with the nitrogen system require management.

- loss of material

**Aging Management Programs**

The following aging management programs manage the aging effects for the nitrogen system components.

- Bolting Integrity
- External Surfaces Monitoring

### 3.3.2.1.6 Chemical and Volume Control

**Materials**

Chemical and volume control system components are constructed of the following materials.

- carbon steel
- CASS
- copper alloy
- copper alloy > 15% zinc
- gray cast iron
- stainless steel

**Environment**

Chemical and volume control system components are exposed to the following environments.

- air – indoor
- lube oil
- treated borated water
- treated borated water > 140°F
- treated water

**Aging Effects Requiring Management**

The following aging effects associated with the chemical and volume control system require management.

- cracking
- cracking – fatigue
- fouling
- loss of material
- loss of material – wear

**Aging Management Programs**

The following aging management programs manage the aging effects for chemical and volume control system components.

- Bolting Integrity
- Boric Acid Corrosion Prevention
- External Surfaces Monitoring
- Heat Exchanger Monitoring
- Oil Analysis
- Periodic Surveillance and Preventive Maintenance
- Selective Leaching
- Water Chemistry Control – Closed Cooling Water
- Water Chemistry Control – Primary and Secondary

### 3.3.2.1.7 Primary Makeup Water

**Materials**

Primary makeup water system components are constructed of the following materials.

- carbon steel
- copper alloy

- glass
- stainless steel

**Environment**

Primary makeup water system components are exposed to the following environments.

- air – indoor
- air – outdoor
- concrete
- steam
- treated water

**Aging Effects Requiring Management**

The following aging effects associated with the primary makeup water system require management.

- cracking
- loss of material

**Aging Management Programs**

The following aging management programs manage the aging effects for primary makeup water system components.

- Bolting Integrity
- External Surfaces Monitoring
- Water Chemistry Control – Primary and Secondary

#### 3.3.2.1.8 Heating, Ventilation and Air Conditioning

**Materials**

Heating, ventilation and air conditioning system components are constructed of the following materials.

- aluminum
- carbon steel
- copper alloy
- elastomer
- stainless steel

**Environment**

Heating, ventilation and air conditioning system components are exposed to the following environments.

- air – indoor
- air – outdoor

**Aging Effects Requiring Management**

The following aging effects associated with the heating, ventilation and air conditioning system require management.

- change in material properties
- cracking
- loss of material

**Aging Management Programs**

The following aging management programs manage the aging effects for the heating, ventilation and air conditioning systems components.

- Bolting Integrity
- External Surfaces Monitoring
- Periodic Surveillance and Preventive Maintenance

#### 3.3.2.1.9 Containment Cooling and Filtration

**Materials**

Containment cooling and filtration system components are constructed of the following materials.

- carbon steel
- copper alloy
- copper alloy > 15% zinc
- elastomer
- stainless steel
- titanium

**Environment**

Containment cooling and filtration system components are exposed to the following environments.

- air – indoor
- condensation

- raw water

**Aging Effects Requiring Management**

The following aging effects associated with the containment cooling and filtration system require management.

- change in material properties
- cracking
- fouling
- loss of material
- loss of material – wear

**Aging Management Programs**

The following aging management programs manage the aging effects for containment cooling and filtration system components.

- Bolting Integrity
- External Surfaces Monitoring
- Periodic Surveillance and Preventive Maintenance
- Service Water Integrity

### 3.3.2.1.10 Control Room HVAC

**Materials**

Control room HVAC system components are constructed of the following materials.

- aluminum
- carbon steel
- copper alloy
- elastomer
- stainless steel

**Environment**

Control room HVAC system components are exposed to the following environments.

- air – indoor
- air – outdoor
- condensation
- gas
- raw water

### Aging Effects Requiring Management

The following aging effects associated with the control room HVAC system require management.

- change in material properties
- cracking
- fouling
- loss of material

### Aging Management Programs

The following aging management programs manage the aging effects for the control room HVAC system components.

- Bolting Integrity
- External Surfaces Monitoring
- Periodic Surveillance and Preventive Maintenance
- Service Water Integrity

## 3.3.2.1.11 Fire Protection – Water

### Materials

Fire protection – water system components are constructed of the following materials.

- carbon steel
- copper alloy
- copper alloy > 15% zinc
- gray cast iron
- stainless steel

### Environment

Fire protection – water system components are exposed to the following environments.

- air – indoor
- air – outdoor
- concrete
- exhaust gas
- soil
- treated water

### Aging Effects Requiring Management

The following aging effects associated with the fire protection – water system require management.

- cracking – fatigue
- loss of material

### Aging Management Programs

The following aging management programs manage the aging effects for fire protection – water system components.

- Aboveground Steel Tanks
- Bolting Integrity
- Buried Piping and Tanks Inspection
- External Surfaces Monitoring
- Fire Protection
- Fire Water System
- Selective Leaching

## 3.3.2.1.12 Fire Protection – $CO_2$, Halon, and RCP Oil Collection Systems

### Materials

Fire protection – $CO_2$, halon, and RCP oil collection systems components are constructed of the following materials.

- aluminum
- carbon steel
- copper alloy
- stainless steel

### Environment

Fire protection – $CO_2$, halon, and RCP oil collection systems components are exposed to the following environments.

- air – indoor
- gas
- lube oil

**Aging Effects Requiring Management**

The following aging effects associated with the fire protection – $CO_2$, halon, and RCP oil collection systems require management.

- loss of material

**Aging Management Programs**

The following aging management programs manage the aging effects for fire protection – $CO_2$, halon, and RCP oil collection systems components.

- Bolting Integrity
- Boric Acid Corrosion Prevention
- Fire Protection
- One-Time Inspection

### 3.3.2.1.13 Fuel Oil

**Materials**

Fuel oil system components are constructed of the following materials.

- carbon steel
- copper alloy
- copper alloy > 15% zinc
- glass
- gray cast iron
- stainless steel

**Environment**

Fuel oil system components are exposed to the following environments.

- air – indoor
- air – outdoor
- concrete
- fuel oil
- soil

**Aging Effects Requiring Management**

The following aging effects associated with the fuel oil system require management.

- fouling
- loss of material

**Aging Management Programs**

The following aging management programs manage the aging effects for fuel oil system components.

- Aboveground Steel Tanks
- Bolting Integrity
- Buried Piping and Tanks Inspection
- Diesel Fuel Monitoring
- External Surfaces Monitoring
- Fire Protection
- Periodic Surveillance and Preventive Maintenance

### 3.3.2.1.14 Emergency Diesel Generator

**Materials**

Emergency diesel generator system components are constructed of the following materials.

- aluminum
- carbon steel
- copper alloy
- copper alloy > 15% zinc
- elastomer
- glass
- gray cast iron
- stainless steel
- titanium

**Environment**

Emergency diesel generator system components are exposed to the following environments.

- air – indoor
- air – outdoor
- condensation
- exhaust gas
- lube oil
- raw water
- treated water
- treated water > 140°F

**Aging Effects Requiring Management**

The following aging effects associated with the emergency diesel generator system require management.

- change in material properties
- cracking
- cracking – fatigue
- fouling
- loss of material
- loss of material – wear

**Aging Management Programs**

The following aging management programs manage the aging effects for emergency diesel generator system components.

- Bolting Integrity
- External Surfaces Monitoring
- Oil Analysis
- One-Time Inspection
- Periodic Surveillance and Preventive Maintenance
- Selective Leaching
- Service Water Integrity
- Water Chemistry Control – Closed Cooling Water

#### 3.3.2.1.15 Security Generator

**Materials**

Security generator system components are constructed of the following materials.

- aluminum
- carbon steel
- copper alloy > 15% zinc
- stainless steel

**Environment**

Security generator system components are exposed to the following environments.

- air – indoor
- exhaust gas
- gas
- soil
- treated water

### Aging Effects Requiring Management

The following aging effects associated with the security generator system require management.

- cracking – fatigue
- fouling
- loss of material

### Aging Management Programs

The following aging management programs manage the aging effects for security generator system components.

- Bolting Integrity
- Buried Piping and Tanks Inspection
- External Surfaces Monitoring
- Periodic Surveillance and Preventive Maintenance
- Selective Leaching
- Water Chemistry Control – Closed Cooling Water

## 3.3.2.1.16 Appendix R Diesel Generators

### Materials

Appendix R diesel generator system components are constructed of the following materials.

- aluminum
- carbon steel
- copper alloy
- copper alloy > 15% zinc
- copper alloy > 15% zinc (inhibited)
- glass
- stainless steel

### Environment

Appendix R diesel generator system components are exposed to the following environments.

- air – indoor
- air – outdoor
- condensation
- exhaust gas
- lube oil

- treated water
- treated water > 140°F

**Aging Effects Requiring Management**

The following aging effects associated with the Appendix R diesel generator system require management.

- cracking
- cracking – fatigue
- fouling
- loss of material
- loss of material – wear

**Aging Management Programs**

The following aging management programs manage the aging effects for Appendix R diesel generator system components.

- Bolting Integrity
- External Surfaces Monitoring
- Heat Exchanger Monitoring
- Oil Analysis
- Periodic Surveillance and Preventive Maintenance
- Selective Leaching
- Water Chemistry Control – Closed Cooling Water

### 3.3.2.1.17 City Water

**Materials**

City water system components are constructed of the following materials.

- carbon steel
- copper alloy
- copper alloy > 15% zinc
- gray cast iron
- stainless steel

**Environment**

City water system components are exposed to the following environments.

- air – indoor
- air – outdoor
- concrete

- soil
- treated water

**Aging Effects Requiring Management**

The following aging effects associated with the city water system require management.

- loss of material

**Aging Management Programs**

The following aging management programs manage the aging effects for city water system components.

- Aboveground Steel Tanks
- Bolting Integrity
- Buried Piping and Tanks Inspection
- External Surfaces Monitoring
- Periodic Surveillance and Preventive Maintenance
- Selective Leaching

### 3.3.2.1.18 Plant Drains

**Materials**

Plant drains components are constructed of the following materials.

- carbon steel
- stainless steel

**Environment**

Plant drains components are exposed to the following environments.

- air – indoor
- air – outdoor
- concrete
- gas
- raw water
- soil
- treated borated water

### Aging Effects Requiring Management

The following aging effects associated with the plant drains require management.

- loss of material

### Aging Management Programs

The following aging management programs manage the aging effects for plant drains components.

- Bolting Integrity
- Boric Acid Corrosion Prevention
- Buried Piping and Tanks Inspection
- External Surfaces Monitoring
- One-Time Inspection
- Periodic Surveillance and Preventive Maintenance
- Water Chemistry Control – Primary and Secondary

## 3.3.2.1.19 Miscellaneous Systems in Scope for 10 CFR 54.4(a)(2)

The following lists encompass materials, environments, aging effects requiring management, and aging management programs for the series 3.3.2-19-xx-IPx tables.

### Materials

Nonsafety-related components affecting safety-related systems are constructed of the following materials.

- aluminum
- carbon steel
- carbon steel coated
- CASS
- copper alloy
- copper alloy > 15% zinc
- elastomer
- glass
- gray cast iron
- nickel alloy
- plastic
- stainless steel

### Environment

Nonsafety-related components affecting safety-related systems are exposed to the following environments.

- air – indoor
- air – treated
- condensation
- fire protection foam
- fuel oil
- gas
- lube oil
- raw water
- steam
- treated borated water
- treated borated water > 140°F
- treated water
- treated water > 140°F

### Aging Effects Requiring Management

The following aging effects associated with nonsafety-related components affecting safety-related systems require management.

- change of material properties
- cracking
- cracking – fatigue
- loss of material

### Aging Management Programs

The following aging management programs manage the effects of aging on nonsafety-related components affecting safety-related systems.

- Bolting Integrity
- Boric Acid Corrosion Prevention
- Diesel Fuel Monitoring
- External Surfaces Monitoring
- Fire Water System
- Flow-Accelerated Corrosion
- Oil Analysis
- One-Time Inspection
- Periodic Surveillance and Preventive Maintenance
- Selective Leaching
- Service Water Integrity
- Water Chemistry Control – Auxiliary Systems

- Water Chemistry Control – Closed Cooling Water
- Water Chemistry Control – Primary and Secondary

### 3.3.2.2 Further Evaluation of Aging Management as Recommended by NUREG-1801

NUREG-1801 indicates that further evaluation is necessary for certain aging effects and other issues discussed in Section 3.3.2.2 of NUREG-1800. The following sections are numbered in accordance with the discussions in NUREG-1800 and explain the IPEC approach to those areas requiring further evaluation. Programs are described in Appendix B.

#### 3.3.2.2.1 Cumulative Fatigue Damage

Where identified as an aging effect requiring management for components designed to ASME Code requirements, the analysis of fatigue is a TLAA as defined in 10 CFR 54.3. TLAAs are evaluated in accordance with 10 CFR 54.21(c). Evaluation of this TLAA is addressed in Section 4.3.

Where fatigue damage is identified as an aging effect requiring management for components with no fatigue design requirements, the aging effect is managed by inspection. The Periodic Surveillance and Preventive Maintenance and Fire Protection Programs will manage cracking due to fatigue for these components by periodic visual inspection of a representative sample of component surfaces.

#### 3.3.2.2.2 Reduction of Heat Transfer due to Fouling

Reduction of heat transfer due to fouling is an aging effect requiring management for stainless steel heat exchanger tubes exposed to treated water. At IPEC there are no stainless steel heat exchanger tubes exposed to treated water in the auxiliary systems with an intended function of heat transfer. This item is not applicable to IPEC.

#### 3.3.2.2.3 Cracking due to Stress Corrosion Cracking (SCC)

1. Cracking due to SCC can occur in the stainless steel components of a BWR standby liquid control (SLC) system. IP2 and IP3 are PWRs and do not have SLC systems. This item is not applicable to IPEC.

2. Cracking due to SCC can occur in stainless steel heat exchanger components exposed to treated water greater than 140°F. For IPEC, the only stainless steel heat exchanger components exposed to treated water greater than 140°F in the auxiliary systems are in the steam generator secondary side sample coolers. This aging effect for these sample coolers is compared to results for the steam and power conversion systems in NUREG1801. This item is not applicable to IPEC.

3. Cracking due to SCC can occur in stainless steel diesel engine exhaust piping exposed to diesel exhaust if moisture can collect inside the component when the diesel is not in operation. At IPEC, the stainless steel exhaust components are not subject to significant moisture accumulation that would allow cracking to

occur. Therefore, cracking due to SCC is not an aging effect requiring management for the stainless steel diesel engine exhaust piping. This item is not applicable to IPEC.

### 3.3.2.2.4 Cracking due to Stress Corrosion Cracking and Cyclic Loading

1. Cracking due to SCC and cyclic loading in stainless steel PWR nonregenerative heat exchanger components exposed to treated borated water greater than 140°F in the chemical and volume control system is an aging effect requiring management. The Water Chemistry Control – Primary and Secondary Program manages cracking of stainless steel non-regenerative heat exchanger components exposed to treated borated water. The program is augmented by the One-Time Inspection Program which will verify the absence of cracking through the use of visual and volumetric NDE techniques. Absence of cracking of the tubes and tubesheet is also verified by monitoring RCS leakage and radiation levels in the component cooling water system. Temperature monitoring is a much less sensitive technique and is not used.

2. Cracking due to SCC and cyclic loading in stainless steel PWR regenerative heat exchanger components exposed to treated borated water greater than 140°F is an aging effect requiring management. The Water Chemistry Control – Primary and Secondary Program manages cracking of stainless steel regenerative heat exchanger components exposed to treated borated water. The regenerative heat exchanger is of all welded construction and inspections are not possible. The water chemistry control program is augmented by the One-Time Inspection Program which will verify the absence of cracking through the use of visual and volumetric NDE techniques of components in similar environments.

3. Cracking due to SCC and cyclic loading could occur in the stainless steel pump casing of PWR high-pressure pumps in the chemical and volume control system (CVCS). Loss of material for the pump casing is managed by the Water Chemistry Control – Primary and Secondary program. The stainless steel CVCS charging pump casings are exposed to treated borated water that is below the 140°F threshold for SCC. Consequently, the Water Chemistry Control – Primary and Secondary Program is not specifically credited to manage cracking of the CVCS charging pumps due to SCC. Cracking of the charging pumps due to cyclic loading is managed by the Periodic Surveillance and Preventive Maintenance Program, which will use visual inspections of external casing surfaces for signs of cracking or leakage during the regularly scheduled quarterly pump surveillances.

### 3.3.2.2.5 Hardening and Loss of Strength due to Elastomer Degradation

1. Cracking and change in material properties due to elastomer degradation in elastomer flexible connections of auxiliary systems and other systems exposed to

air – indoor are aging effects requiring management at IPEC. These aging effects are managed by the Periodic Surveillance and Preventive Maintenance Program. This program includes periodic visual inspections and physical manipulation of the flexible connections to confirm that the components are not experiencing any aging that would affect accomplishing their intended functions.

2. For the auxiliary systems at IPEC no credit is taken for any elastomer linings to prevent loss of material from the underlying material such that the linings would require aging management. With respect to elastomer linings, this item is not applicable to IPEC. However, the applicable NUREG-1801 line was used as a comparison for elastomer components exposed to treated water. Cracking and change in material properties due to elastomer degradation in these components are managed by the Periodic Surveillance and Preventive Maintenance Program. This program includes periodic visual inspections of a representative sample of interior and exterior elastomer surfaces to confirm that the components are not experiencing any aging that would affect accomplishing their intended functions.

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

Reduction of neutron-absorbing capacity and loss of material due to general corrosion are aging effects requiring management for Boral spent fuel storage racks exposed to a treated borated water environment. These aging effects are managed by the Boral Surveillance Program. This program uses coupon samples to periodically monitor physical and chemical properties of the absorber material. The Boral Surveillance Program is supplemented by the Water Chemistry Control – Primary and Secondary Program.

#### 3.3.2.2.7 Loss of Material due to General, Pitting, and Crevice Corrosion

1. Steel piping and components in auxiliary systems that are exposed to lubricating oil are managed by the Oil Analysis Program, which includes periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. The One-Time Inspection Program will use visual inspections or non-destructive examinations of representative samples to confirm that the Oil Analysis Program has been effective at managing aging effects for components that credit this program.

   Steel piping components and tanks of the reactor coolant pump oil collection system are not continuously exposed to a lubricating oil environment that is maintained by the Oil Analysis Program. Therefore this program is not credited for managing loss of material on these components. Instead these components are managed by the One-Time Inspection Program. This program will use visual or volumetric NDE techniques to inspect a representative sample of the internal surfaces to assure there is no significant corrosion.

2. Loss of material due to general, pitting, and crevice corrosion could occur in steel components in the BWR reactor water cleanup and shutdown cooling systems exposed to treated water. IP2 and IP3 are PWRs and do not have these systems. This item is not applicable to IPEC.

3. Loss of material due to general (steel only) pitting and crevice corrosion for carbon steel and stainless steel diesel exhaust piping and components exposed to diesel exhaust in the emergency diesel generator, Appendix R diesel generator and security generator systems is managed by the Periodic Surveillance and Preventive Maintenance (PSPM) Program. This program uses periodic visual inspections to manage loss of material for these components. Additionally, the One-Time Inspection program will use visual or volumetric NDE techniques to inspect a representative sample of the internal surfaces of stainless steel components of the emergency diesel generator systems. The carbon steel diesel exhaust piping and components in the fire protection system are managed by the Fire Protection Program. The Fire Protection Program uses visual inspections of diesel exhaust piping and components to manage loss of material. These inspections in the PSPM, One-Time Inspection and Fire Protection Programs will manage the aging effect of loss of material such that the intended function of the components will not be affected.

#### 3.3.2.2.8 Loss of Material due to General, Pitting, Crevice, and Microbiologically-Influenced Corrosion (MIC)

Loss of material due to general, pitting, crevice, and MIC for carbon steel (with or without coating or wrapping) piping and components buried in soil in the auxiliary systems at IPEC is managed by the Buried Piping and Tanks Inspection Program. This program will include (a) preventive measures to mitigate corrosion and (b) inspections to manage the effects of corrosion on the pressure-retaining capability of buried carbon steel components. Buried components will be inspected when excavated during maintenance. An inspection will be performed within ten years of entering the period of extended operation and within ten years after entering the period of extended operation, unless an opportunistic inspection occurred within these ten-year periods. This program will manage the aging effect of loss of material such that the intended function of the components will not be affected.

#### 3.3.2.2.9 Loss of Material due to General, Pitting, Crevice, Microbiologically-Influenced Corrosion and Fouling

1. Loss of material due to general, pitting, crevice, and MIC for carbon steel piping and components exposed to fuel oil is an aging effect requiring management at

IPEC and these components are managed by the Diesel Fuel Monitoring Program. This program includes sampling and monitoring of fuel oil quality to ensure they remain within the limits specified by the ASTM standards. Maintaining parameters within limits ensures that significant loss of material will not occur. The One-Time Inspection Program will use visual inspections or non-destructive examinations of representative samples to confirm that the Diesel Fuel Monitoring Program has been effective at managing aging effects for components that credit this program.

2. Loss of material due to general, pitting, crevice and MIC for carbon steel heat exchanger components exposed to lubricating oil is an aging effect requiring management in the auxiliary systems at IPEC and is managed by the Oil Analysis Program. This program includes periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. The One-Time Inspection Program will use visual inspections or non-destructive examinations of representative samples to confirm that the Oil Analysis Program has been effective at managing aging effects for components that credit this program.

#### 3.3.2.2.10 Loss of Material due to Pitting and Crevice Corrosion

1. Loss of material due to pitting and crevice corrosion could occur in steel piping with elastomer lining that is exposed to treated borated water if the lining is degraded. For the auxiliary systems at IPEC, there are no elastomer-lined steel components within the scope of license renewal. The NUREG-1801 line for stainless steel clad steel components exposed to treated water applies to BWRs and was not used. This item does not apply to IPEC.

2. In the auxiliary systems at IPEC there are no aluminum components exposed to treated water. Aging management results for loss of material in stainless steel auxiliary system components exposed to treated water are compared to NUREG-1801 lines in the ESF and S&PC systems which consider the PWR water chemistry programs, since the corresponding line for auxiliary systems considers only BWR chemistry. Consistent with the NUREG-1801 lines in the ESF and S&PC systems, loss of material due to pitting and crevice corrosion for stainless steel components exposed to treated water is managed by the Water Chemistry Control – Primary and Secondary Program. The effectiveness of the program will be confirmed by the One-Time Inspection Program through an inspection of a representative sample of components crediting this program including susceptible locations such as areas of stagnant flow.

3. Loss of material due to pitting and crevice corrosion for copper alloy components exposed to condensation (external) in the HVAC and other systems is managed by the External Surfaces Monitoring and Periodic Surveillance and Preventive

Maintenance (PSPM) Programs. The External Surfaces Monitoring Program includes a periodic visual inspection. The PSPM Program includes visual inspections and other NDE techniques to manage loss of material of the components. These inspections will manage the aging effect of loss of material such that the intended function of the components will not be affected.

4. Loss of material due to pitting and crevice corrosion for copper alloy components exposed to lubricating oil in auxiliary systems at IPEC is managed by the Oil Analysis Program, which includes periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. The One-Time Inspection Program will use visual inspections or non-destructive examinations of representative samples to confirm that the Oil Analysis Program has been effective at managing aging effects for components that credit this program.

5. Loss of material due to pitting and crevice corrosion for aluminum piping and components and stainless steel components exposed to condensation is an aging effect requiring management for HVAC and other systems at IPEC. The Bolting Integrity, External Surfaces Monitoring, Periodic Surveillance and Preventive Maintenance, and One-Time Inspection Programs will manage loss of material in aluminum or stainless steel components exposed internally or externally to condensation. These programs include a periodic visual inspection and the PSPM program includes the use of other NDE techniques as appropriate to manage loss of material of the components.

6. Loss of material due to pitting and crevice corrosion could occur for copper alloy fire protection system piping, piping components, and piping elements exposed to internal condensation. At IPEC there are no copper alloy components exposed to condensation in the fire protection systems. However, this item can be applied to copper alloy components exposed to internal condensation in other systems. The Periodic Surveillance and Preventive Maintenance Program will manage loss of material in copper alloy components exposed internally to condensation, through the use of periodic visual inspections or other NDE techniques.

7. Loss of material due to pitting and crevice corrosion could occur for stainless steel piping, piping components, and piping elements exposed to soil. At IPEC there are no stainless steel piping components exposed to soil in the auxiliary systems. This item is not applicable to IPEC.

8. Loss of material due to pitting and crevice corrosion could occur for stainless steel piping, piping components, and piping elements of the BWR Standby Liquid Control System that are exposed to sodium pentaborate solution. IP2 and IP3 are PWRs and do not have SLC systems. This item is not applicable to IPEC.

### 3.3.2.2.11 Loss of Material due to Pitting, Crevice and Galvanic Corrosion

This item pertains to loss of material in copper alloy auxiliary system components exposed to a BWR treated water environment. This item is not applicable to IPEC.

### 3.3.2.2.12 Loss of Material due to Pitting, Crevice, and Microbiologically-Influenced Corrosion

1. Loss of material due to pitting, crevice, and MIC in stainless steel and copper alloy piping and components exposed to fuel oil is an aging effect requiring management at IPEC and most of these components are managed by the Diesel Fuel Monitoring Program. There are no aluminum components exposed to fuel oil in the auxiliary systems. The Diesel Fuel Monitoring Program includes sampling and monitoring of fuel oil quality to ensure it remains within the limits specified by the ASTM standards. Maintaining parameters within limits ensures that significant loss of material will not occur. The One-Time Inspection Program will use visual inspections or non-destructive examinations of representative samples to confirm that the Diesel Fuel Monitoring Program has been effective at managing aging effects for components that credit this program. The Periodic Surveillance and Preventive Maintenance Program will manage loss of material for the stainless steel components of the emergency fuel oil trailer transfer tank using periodic visual inspections.

2. Loss of material due to pitting, crevice, and MIC in most stainless steel piping and components exposed to lubricating oil is managed by the Oil Analysis Program which includes periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. The One-Time Inspection Program will use visual inspections or non-destructive examinations of representative samples to confirm that the Oil Analysis Program has been effective at managing aging effects for components that credit this program.

   Stainless steel piping components of the reactor coolant pump oil collection system are not continuously exposed to lubricating oil environment that is maintained by the Oil Analysis Program. Therefore this program is not credited for managing loss of material on these components. Instead these components are managed by the One-Time Inspection Program. This program will use visual or volumetric NDE techniques to inspect a representative sample of the internal surfaces to assure there is no significant corrosion.

### 3.3.2.2.13 Loss of Material due to Wear

Loss of material due to wear could occur in the elastomer seals and components exposed to air – indoor uncontrolled (internal or external). Wear is the removal of surface layers due to relative motion between two surfaces. At IPEC, in the auxiliary systems, this specific aging effect for elastomers is not applicable since the expansion joints are fixed at both ends and do not contact any other components such that wear could occur. Where the aging effects of change in material properties and cracking are identified for elastomer components, they are managed by the Periodic Surveillance and Preventive Maintenance Program. This item is not applicable to IPEC auxiliary systems.

#### 3.3.2.2.14 Cracking due to Underclad Cracking

Cracking due to underclad cracking could occur for PWR steel charging pump casings with stainless steel cladding exposed to treated borated water. The IPEC charging pump casings are not clad but are made of stainless steel. This item is not applicable to IPEC.

#### 3.3.2.2.15 Quality Assurance for Aging Management of Nonsafety-Related Components

See Appendix B Section B.0.3 for discussion of IPEC quality assurance procedures and administrative controls for aging management programs.

### 3.3.2.3 Time-Limited Aging Analysis

The only time-limited aging analysis identified for auxiliary systems components is metal fatigue. This is evaluated in Section 4.3.

## 3.3.3 Conclusion

The auxiliary system components that are subject to aging management review have been identified in accordance with the requirements of 10 CFR 54.21. The aging management programs selected to manage the effects of aging on auxiliary system components are identified in Section 3.3.2.1 and in the following tables. A description of these aging management programs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation.

Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the auxiliary system components will be managed such that there is reasonable assurance that the intended functions will be maintained consistent with the current licensing basis during the period of extended operation.

## Table 3.3.1
## Summary of Aging Management Programs for the Auxiliary System Evaluated in Chapter VII of NUREG-1801

**Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.3.1-1 | 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 | This line item was not used. Steel cranes are evaluated as structural components in Section 3.5. |
| 3.3.1-2 | 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 is a TLAA.<br>See Section 3.3.2.2.1. |

**Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.3.1-3 | Stainless steel heat exchanger tubes exposed to treated water | Reduction of heat transfer due to fouling | Water Chemistry and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Not applicable. There are no stainless steel heat exchanger tubes exposed to treated water in the auxiliary systems with an intended function of heat transfer.<br>See Section 3.3.2.2.2. |
| 3.3.1-4 | BWR only | | | | |
| 3.3.1-5 | Stainless steel and stainless clad steel heat exchanger components exposed to treated water >60°C (> 140°F) | Cracking due to stress corrosion cracking | Plant specific | Yes, plant specific | Not applicable. The only stainless steel heat exchanger components exposed to treated water in the auxiliary systems are in the steam generator secondary side sample coolers, which are addressed in other lines.<br>See Section 3.3.2.2.3 item 2. |
| 3.3.1-6 | Stainless steel diesel engine exhaust piping, piping components, and piping elements exposed to diesel exhaust | Cracking due to stress corrosion cracking | Plant specific | Yes, plant specific | Not applicable. The stainless steel diesel exhaust components are not subject to significant moisture accumulation, which precludes cracking due to stress corrosion cracking.<br>See Section 3.3.2.2.3 item 3. |

**Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.3.1-7 | Stainless steel nonregenerative heat exchanger components exposed to treated borated water >60°C (> 140°F) | Cracking due to stress corrosion cracking and cyclic loading | Water Chemistry 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, plant specific | The Water Chemistry Control – Primary and Secondary Program manages cracking of stainless steel non-regenerative heat exchanger components exposed to treated borated water. The program is augmented by the One-Time Inspection Program which will verify the absence of cracking. Absence of cracking of the tubes and tubesheet is also verified by additional monitoring.<br>See Section 3.3.2.2.4 item 1. |

| Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1 | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 3.3.1-8 | 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 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, plant specific | Stainless steel components of some heat exchangers to which this NUREG-1801 line item applies, including the regenerative heat exchanger, are in the reactor coolant systems in series 3.1.2-x tables. The Water Chemistry Control – Primary and Secondary and Inservice Inspection Programs manage cracking of stainless steel heat exchanger bonnets and shells exposed to treated borated water. The Water Chemistry Control – Primary and Secondary Program manages cracking of stainless steel heat exchanger tubes. The program is augmented by the One-Time Inspection Program which will verify the absence of cracking in similar material environment combinations since the regenerative heat exchanger cannot be inspected internally.<br>(continued) |

| Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1 | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| | | | | | Within the auxiliary systems, this NUREG-1801 line is compared to the stainless steel components of the reactor coolant pump seal return heat exchanger. The Water Chemistry Control – Primary and Secondary Program manages cracking of these components. The program is augmented by the One-Time Inspection Program to verify the absence of cracking.<br>See Section 3.3.2.2.4 item 2. |
| 3.3.1-9 | Stainless steel high-pressure pump casing in PWR chemical and volume control system | Cracking due to stress corrosion cracking and cyclic loading | Water Chemistry 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, plant specific | Treated borated water in the chemical volume control system pumps is less than the 140°F threshold for stress corrosion cracking. Consequently, the Water Chemistry Control – Primary and Secondary Program is not specifically credited to manage cracking due to stress corrosion cracking of the CVCS charging pumps. Cracking of the charging pumps due to cyclic loading is managed by the Periodic Surveillance and Preventive Maintenance Program.<br>See Section 3.3.2.2.4 item 3. |

**Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | 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<br>The AMP is to be augmented by appropriate inspection to detect cracking if the bolts are not otherwise replaced during maintenance. | Yes, if the bolts are not replaced during maintenance | Not applicable. High strength steel bolting is not used in the auxiliary systems. |
| 3.3.1-11 | Elastomer seals and components exposed to air – indoor uncontrolled (internal/external) | Hardening and loss of strength due to elastomer degradation | Plant specific | Yes, plant specific | For elastomer components susceptible to a change in material properties, the aging effect will be managed by the Periodic Surveillance and Preventive Maintenance Program.<br>See Section 3.3.2.2.5 item 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 that determines and assesses the qualified life of the linings in the environment is to be evaluated. | Yes, plant specific | No credit is taken for elastomer linings at IPEC to prevent aging effects. The change in material properties of elastomer components exposed to treated water will be managed by the Periodic Surveillance and Preventive Maintenance Program.<br>See Section 3.3.2.2.5 item 2. |

**Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | 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 | Plant specific | Yes, plant specific | The Boral Surveillance Program, supplemented by the Water Chemistry Control – Primary and Secondary Program, manages the degradation of Boral including the reduction of neutron-absorbing capacity.<br>See Section 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 and One-Time Inspection | Yes, detection of aging effects is to be evaluated | The Oil Analysis Program manages loss of material in steel components. The One-Time Inspection Program will be used to confirm the effectiveness of the Oil Analysis Program.<br>See Section 3.3.2.2.7 item 1. |
| 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 and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Loss of material for the reactor coolant pump oil collection components exposed to lubricating oil will be managed by the One-Time Inspection Program.<br>See Section 3.3.2.2.7 item 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 and One-Time Inspection to evaluate the thickness of the lower portion of the tank | Yes, detection of aging effects is to be evaluated | Loss of material for the reactor coolant pump oil collection components exposed to lubricating oil will be managed by the One-Time Inspection Program.<br>See Section 3.3.2.2.7 item 1. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.3.1-17 | 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 | Plant specific | Yes, plant specific | The Periodic Surveillance and Preventive Maintenance, One-Time Inspection and Fire Protection Programs will manage loss of material in steel and stainless steel components exposed to diesel exhaust.<br>See Section 3.3.2.2.7 item 3. |
| 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 Surveillance<br>or<br>Buried Piping and Tanks Inspection | No<br>Yes, detection of aging effects and operating experience are to be further evaluated | Consistent with NUREG-1801. The loss of material of buried steel components will be managed by the Buried Piping and Tanks Inspection Program.<br>See Section 3.3.2.2.8. |

**Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 and One-Time Inspection | Yes, detection of aging effects is to be evaluated | The Diesel Fuel Monitoring Program manages loss of material in steel components. The One-Time Inspection Program will be used to confirm the effectiveness of the Diesel Fuel Monitoring Program.<br>See Section 3.3.2.2.9 item 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 and One-Time Inspection | Yes, detection of aging effects is to be evaluated | The Oil Analysis Program manages loss of material in steel heat exchanger components. The One-Time Inspection Program will be used to confirm the effectiveness of the Oil Analysis Program.<br>See Section 3.3.2.2.9 item 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 and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Not applicable. There are no elastomer lined steel components exposed to treated borated water with a license renewal intended function. The NUREG-1801 line for stainless steel clad steel components exposed to treated water applies to BWRs and was not used.<br>See Section 3.3.2.2.10 item 1. |
| 3.3.1-23 | BWR only | | | | |

| **Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1** | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 3.3.1-24 | Stainless steel and aluminum piping, piping components, and piping elements exposed to treated water | Loss of material due to pitting and crevice corrosion | Water Chemistry and One-Time Inspection | Yes, detection of aging effects is to be evaluated | This line was not used. Results for loss of material in stainless steel auxiliary system components exposed to treated water are compared to NUREG-1801 lines in the ESF and S&PC systems which consider the PWR water chemistry programs. There are no aluminum piping components exposed to treated water in the auxiliary systems.<br>See Section 3.3.2.2.10 item 2. |
| 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, plant specific | The External Surfaces Monitoring, and Periodic Surveillance and Preventive Maintenance Programs will manage loss of material in copper alloy components.<br>See Section 3.3.2.2.10 item 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 and One-Time Inspection | Yes, detection of aging effects is to be evaluated | The Oil Analysis Program manages loss of material in copper alloy components. The One-Time Inspection Program will be used to confirm the effectiveness of the Oil Analysis Program.<br>See Section 3.3.2.2.10 item 4. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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, plant specific | The Bolting Integrity, External Surfaces Monitoring, Periodic Surveillance and Preventive Maintenance and One-Time Inspection Programs manage loss of material in aluminum and stainless steel components.<br>See Section 3.3.2.2.10 item 5. |
| 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, plant specific | The Periodic Surveillance and Preventive Maintenance Program will manage loss of material in copper alloy components exposed to condensation.<br>See Section 3.3.2.2.10 item 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, plant specific | Not applicable. There are no buried stainless steel components in the auxiliary systems.<br>See Section 3.3.2.2.10 item 7. |
| 3.3.1-30 | BWR only | | | | |
| 3.3.1-31 | BWR only | | | | |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Consistent with NUREG-1801 for most components. The Diesel Fuel Monitoring Program manages loss of material in stainless steel and copper alloy components. The One-Time Inspection Program will be used to confirm the effectiveness of the Diesel Fuel Monitoring Program. The Periodic Surveillance and Preventive Maintenance Program will manage loss of material for the stainless steel components of the emergency fuel oil trailer transfer tank using periodic visual inspections. There are no aluminum components exposed to fuel oil in the auxiliary systems.<br>See Section 3.3.2.2.12 item 1. |
| 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 and One-Time Inspection | Yes, detection of aging effects is to be evaluated | The Oil Analysis Program manages loss of material in stainless steel components. The One-Time Inspection Program will be used to confirm the effectiveness of the Oil Analysis Program. The One-Time Inspection Program will also confirm the absence of significant aging effects for stainless steel reactor coolant pump oil collection components exposed to lubricating oil.<br>See Section 3.3.2.2.12 item 2. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.3.1-34 | Elastomer seals and components exposed to air – indoor uncontrolled (internal or external) | Loss of material due to Wear | Plant specific | Yes, plant specific | Not applicable. There are no elastomer components with loss of material due to wear as an applicable aging effect.<br>See Section 3.3.2.2.13. |
| 3.3.1-35 | Steel with stainless steel cladding pump casing exposed to treated borated water | Loss of material/ 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, verify plant specific program addresses cladding breach | Not applicable. The charging pump casings are not clad but are made of stainless steel.<br>See Section 3.3.2.2.14. |
| 3.3.1-36 | BWR only | | | | |
| 3.3.1-37 | BWR only | | | | |
| 3.3.1-38 | BWR only | | | | |
| 3.3.1-39 | 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 | Consistent with NUREG-1801. The Aboveground Steel Tanks Program will manage loss of material in steel tanks exposed to outdoor air. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 | No | Not applicable. High-strength steel closure bolting is not used in the auxiliary systems. |
| 3.3.1-42 | Steel closure bolting exposed to air with steam or water leakage | Loss of material due to general corrosion | Bolting Integrity | No | This line item was not used. Loss of material of steel closure bolting was addressed by other items including 3.3.1-43, 3.3.1-44 and 3.3.1-55. |
| 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 | No | Consistent with NUREG-1801. The Bolting Integrity Program manages the loss of material for steel bolting exposed to indoor uncontrolled or outdoor air. |
| 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 | No | Consistent with NUREG-1801. The Bolting Integrity Program manages the loss of material for steel bolting exposed to condensation. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 | No | Loss of preload is a design-driven effect and not an aging effect requiring management. Bolting at IPEC is standard grade B7 low alloy steel, or similar material, except in rare specialized applications such as where stainless steel bolting is utilized. Loss of preload due to stress relaxation (creep) would only be a concern in very high temperature applications (> 700°F), as stated in the ASME Code, Section II, Part D, Table 4. No bolting operates at > 700°F. Therefore, loss of preload due to stress relaxation (creep) is not an applicable aging effect for auxiliary systems. Other issues such as gasket creep and loosening that may result in pressure boundary joint leakage are improper design or maintenance issues. Improper bolting application (design) and maintenance issues are current plant operational concerns and not related to aging effects or mechanisms that require management during the period of extended operation.<br>(continued) |

| Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1 | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| | | | | | As described in the Bolting Integrity Program, IPEC has taken actions to address NUREG–1339, *Resolution to Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants*. These actions include implementation of good bolting practices in accordance with EPRI NP-5067, Good Bolting Practices. Proper joint preparation and make-up in accordance with industry standards is expected to preclude loss of preload. This has been confirmed by operating experience at IPEC. |

| Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1 | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 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 | No | Consistent with NUREG-1801 for components of closed cooling systems including the component cooling water and emergency diesel generator cooling systems. The Water Chemistry Control – Closed Cooling Water Program manages cracking for stainless steel components. For other systems with controlled water chemistry, including the house service boiler systems, the Water Chemistry Control – Auxiliary Systems Program manages cracking for stainless steel components. The One-Time Inspection Program for Water Chemistry will use inspections or non-destructive examinations of representative samples to verify that the Water Chemistry Control – Auxiliary Systems and Water Chemistry Control – Closed Cooling Water Programs have been effective at managing aging effects. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 | No | Consistent with NUREG-1801 for components of closed cooling systems such as the component cooling water and emergency diesel generator cooling systems. The Water Chemistry Control – Closed Cooling Water Program manages loss of material for steel components. For other systems with controlled water chemistry, such as the security diesel, or the house service boiler and the components of interfacing systems, the Water Chemistry Control – Auxiliary Systems Program manages loss of material for steel components. The One-Time Inspection Program for Water Chemistry will use visual inspections or non-destructive examinations of representative samples to verify that the Water Chemistry Control – Auxiliary Systems and Water Chemistry Control – Closed Cooling Water Programs have been effective at managing aging effects. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | 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 | No | Consistent with NUREG-1801. The Water Chemistry Control – Closed Cooling Water Program manages loss of material for steel heat exchanger components. |
| 3.3.1-49 | Stainless steel; steel with stainless steel cladding heat exchanger components exposed to closed cycle cooling water | Loss of material due to microbiologically influenced corrosion | Closed-Cycle Cooling Water System | No | Consistent with NUREG-1801. The Water Chemistry Control – Closed Cooling Water Program manages loss of material for stainless steel heat exchanger components. |

| Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1 | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 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 | No | Consistent with NUREG-1801 for components of closed cooling systems such as the component cooling water and emergency diesel generator cooling systems. The Water Chemistry Control – Closed Cooling Water Program manages loss of material for stainless steel components. For other systems with controlled water chemistry, such as the house service boiler systems, the Water Chemistry Control – Auxiliary Systems Program manages loss of material for stainless steel components. The One-Time Inspection Program for Water Chemistry will use visual inspections or non-destructive examinations of representative samples to verify that the Water Chemistry Control – Auxiliary Systems and Water Chemistry Control – Closed Cooling Water Programs have been effective at managing aging effects. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 | No | Consistent with NUREG-1801 for components of closed cooling systems such as the component cooling water and emergency diesel generator cooling systems. The Water Chemistry Control – Closed Cooling Water Program manages loss of material for copper alloy components. For other systems with controlled water chemistry, such as the security diesel, or the house service boiler and the components of interfacing systems, the Water Chemistry Control – Auxiliary Systems Program manages loss of material for copper alloy components. The One-Time Inspection Program for Water Chemistry will use visual inspections or non-destructive examinations of representative samples to verify that the Water Chemistry Control – Auxiliary Systems and Water Chemistry Control – Closed Cooling Water Programs have been effective at managing aging effects. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 | No | Consistent with NUREG-1801 for heat exchangers cooled by closed cooling systems such as the component cooling water and emergency diesel generator cooling systems. The Water Chemistry Control – Closed Cooling Water Program manages reduction of heat transfer for stainless steel and copper alloy heat exchanger tubes exposed to closed cycle cooling water. For heat exchangers cooled by other systems with controlled water chemistry, such as the security diesel systems, the Water Chemistry Control – Auxiliary Systems Program manages the reduction of heat transfer for copper alloy heat exchanger tubes. The One-Time Inspection Program for Water Chemistry will use visual inspections or non-destructive examinations of representative samples to verify that the Water Chemistry Control – Auxiliary Systems and Water Chemistry Control – Closed Cooling Water Programs have been effective at managing aging effects. The auxiliary systems have no steel heat exchanger tubes exposed to closed cycle cooling water with a heat transfer intended function. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | 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 | The Periodic Surveillance and Preventive Maintenance Program manages loss of material in steel station air system components exposed internally to condensation. The program will periodically use visual or other NDE techniques to inspect a representative sample of 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 | The One-Time Inspection Program will confirm the absence of significant loss of material for stainless steel components exposed to internal condensation. Visual or other NDE techniques will be used to inspect a representative sample of the internal surfaces to confirm the absence of significant loss of material. |
| 3.3.1-55 | Steel ducting closure bolting exposed to air – indoor uncontrolled (external) | Loss of material due to general corrosion | External Surfaces Monitoring | No | Consistent with NUREG-1801. The External Surfaces Monitoring Program manages loss of material for steel closure bolting in the HVAC systems. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 | No | Consistent with NUREG-1801 for most steel HVAC components. The External Surfaces Monitoring Program manages loss of material for external surfaces of steel components. The Periodic Surveillance and Preventive Maintenance Program manages loss of material for external surfaces of portable steel ventilation equipment by periodic inspections. |
| 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 | No | Consistent with NUREG-1801. The External Surfaces Monitoring Program manages loss of material for external surfaces of steel components. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 | No | Consistent with NUREG-1801 for most steel components. The External Surfaces Monitoring Program manages loss of material for external surfaces. For some steel components of the fire protection – CO2, halon, and RCP oil collection systems, the Fire Protection Program manages loss of material using periodic visual inspections. The Periodic Surveillance and Preventive Maintenance Program periodically inspects external steel surfaces of components inside the fan cooler units of the containment cooling and filtration system to manage loss of material. |
| 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 | No | Consistent with NUREG-1801 for most steel heat exchanger components. The External Surfaces Monitoring Program manages loss of material for external surfaces of steel heat exchanger components. The Periodic Surveillance and Preventive Maintenance Program periodically inspects external steel surfaces of heat exchanger components inside the fan cooler units of the containment cooling and filtration system to manage loss of material. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 | No | Consistent with NUREG-1801. The External Surfaces Monitoring Program manages loss of material for external surfaces of steel components. |
| 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 | No | This line item was not used in the auxiliary systems tables. Fire barrier seals are evaluated as structural components in Section 3.5. Cracking and the change in material properties of elastomer seals are managed by the Fire Protection Program. |
| 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 | No | The One-Time Inspection Program will use visual or other NDE techniques to confirm the absence of significant loss of material for aluminum components of the lube oil system exposed to raw water. The Service Water Integrity Program uses periodic inspections to manage loss of material for aluminum components of the service water system exposed to raw water. The components to which this NUREG-1801 line item applies are included in scope under criterion 10 CFR 54.4(a)(2) and are listed in series 3.3.2-19-xx tables. |

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| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.3.1-63 | Steel fire rated doors exposed to air – outdoor or air - indoor uncontrolled | Loss of material due to Wear | Fire Protection | No | This line item was not used in the auxiliary systems tables. Steel fire doors are evaluated as structural components in Section 3.5. The loss of material for fire doors is managed by the Fire Protection Program. |
| 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 and Fuel Oil Chemistry | No | Consistent with NUREG-1801. The Fire Protection and Diesel Fuel Monitoring Programs manage loss of material of steel diesel fire pump fuel supply piping. |
| 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 and Structures Monitoring Program | No | This line item was not used. Reinforced concrete structural fire barriers are evaluated as structural components in Section 3.5. |
| 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 and Structures Monitoring Program | No | This line item was not used. Reinforced concrete structural fire barriers are evaluated as structural components in Section 3.5. |

**Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | 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 and Structures Monitoring Program | No | This line item was not used. Reinforced concrete structural fire barriers are evaluated as structural components in Section 3.5. |
| 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 | No | Consistent with NUREG-1801. The loss of material in steel components exposed to raw or untreated water is managed by the Fire Water System Program. |
| 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 | No | Consistent with NUREG-1801. The loss of material in stainless steel components exposed to raw water is managed by the Fire Water System Program. |
| 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 | No | Consistent with NUREG-1801. The loss of material in copper alloy components exposed to raw water is managed by the Fire Water System Program. |

**Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 | No | The Periodic Surveillance and Preventive Maintenance Program uses periodic visual inspections to manage loss of material for internal surfaces of steel diesel generator air start system components of the emergency and Appendix R diesel generators. |
| 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 | No | The Periodic Surveillance and Preventive Maintenance Program uses periodic visual inspections to manage loss of material for internal surfaces of steel ducting and components exposed to condensation.<br>The External Surfaces Monitoring Program manages loss of material for external carbon steel components of the service water system exposed to condensation, by visual inspection of external surfaces. For systems where internal carbon steel surfaces are exposed to the same environment as external surfaces, external surface conditions will be representative of internal surfaces. Thus, loss of material on internal carbon steel surfaces of the service water system exposed to condensation, is also managed by the External Surfaces Monitoring Program. |

| **Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1** | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **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 | No | This line item was not used in the auxiliary systems tables. Steel crane structural girders are evaluated as structural components in Section 3.5. Loss of material for steel crane structural components is managed by the Periodic Surveillance and Preventive Maintenance and Structures Monitoring Programs using periodic visual or other NDE techniques. |
| 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 | No | This line item was not used. Steel crane rails are evaluated as structural components in Section 3.5. |
| 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 | No | The Periodic Surveillance and Preventive Maintenance Program uses periodic visual inspections of internal and external surfaces of components to manage cracking and change of material properties in elastomeric components exposed to raw water. The components to which this NUREG-1801 line item applies are included in scope under criterion 10 CFR 54.4(a)(2) and are listed in series 3.3.2-19-xx tables in systems other than service water. |

**Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 | No | Consistent with NUREG-1801 for components exposed to raw water in the service water system. The Service Water Integrity Program manages loss of material in steel components. For other steel components exposed to raw water, the Periodic Surveillance and Preventive Maintenance Program uses periodic visual inspections of internal surfaces of components to manage loss of material. |
| 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 | No | Consistent with NUREG-1801. The Service Water Integrity Program manages loss of material for steel heat exchanger components. |
| 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 | No | Consistent with NUREG-1801 for nickel alloy components exposed to raw water from the service water system. The Service Water Integrity Program manages loss of material in nickel alloy components. Stainless steel and copper alloy components exposed to raw water are addressed in other items including 3.3.1-79 and 3.3.1-81. |

**Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 | No | Consistent with NUREG-1801 for most components exposed to raw water from the service water system. The Service Water Integrity Program manages loss of material in stainless steel components. For other stainless steel components exposed to raw water, the One-Time Inspection Program will use visual or other NDE techniques to confirm the absence of significant loss of material. |
| 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 | No | Consistent with NUREG-1801 for copper alloy components of the EDG system. The Service Water Integrity Program manages loss of material in copper alloy components exposed to raw water. There are no stainless steel components exposed to raw water in the EDG system. |

**Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | 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 | No | Consistent with NUREG-1801 for components exposed to raw water in the service water system. The Service Water Integrity Program manages loss of material in copper alloy components. For copper alloy components exposed to raw water in other systems, the Periodic Surveillance and Preventive Maintenance Program uses periodic visual inspections of internal surfaces of components to manage loss of material. |
| 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 | No | Consistent with NUREG-1801. The Service Water Integrity Program manages loss of material in copper alloy heat exchanger components. |
| 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 | No | Consistent with NUREG-1801. The Service Water Integrity Program manages reduction of heat transfer in stainless steel and copper alloy heat exchanger tubes exposed to raw water. |

**Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 | No | Consistent with NUREG-1801. The Selective Leaching Program will manage loss of material in copper alloy > 15% zinc components exposed to all types of water. |
| 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 | No | Consistent with NUREG-1801. The Selective Leaching Program will manage loss of material in gray cast iron components exposed to soil and all types of water. |
| 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 | No | This line item was not used. Structural steel of the new fuel storage rack assembly is evaluated as a structural component in Section 3.5. |

**Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.3.1-87 | Boraflex spent fuel storage racks neutron-absorbing sheets exposed to treated borated water | Reduction of neutron absorbing capacity due to boraflex degradation | Boraflex Monitoring | No | The Boraflex Monitoring Program, supplemented by the Water Chemistry Control – Primary and Secondary Program, manages the degradation of Boraflex. |
| 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 | No | Consistent with NUREG-1801. The Boric Acid Corrosion Prevention Program manages loss of material in copper alloy > 15% Zn components exposed to air with borated water leakage. There are no aluminum components exposed to air with borated water leakage in the auxiliary systems. |
| 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 | No | Consistent with NUREG-1801. The Boric Acid Corrosion Prevention Program manages loss of material in steel components exposed to air with borated water leakage. |

**Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 | No | Consistent with NUREG-1801. The Water Chemistry Control – Primary and Secondary Program manages cracking in stainless steel components exposed to treated borated water > 140°F. |
| 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 | No | Consistent with NUREG-1801. The Water Chemistry Control – Primary and Secondary Program manages loss of material in stainless steel components exposed to treated borated water. |
| 3.3.1-92 | Galvanized steel piping, piping components, and piping elements exposed to air – indoor uncontrolled | None | None | NA - No AEM or AMP | Not applicable. Galvanized steel surfaces are evaluated as steel for the auxiliary systems. |

| **Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1** | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 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 - No AEM or AMP | 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 - No AEM or AMP | Consistent with NUREG-1801 for stainless steel components. There are no nickel alloy components exposed to air – indoor uncontrolled in the auxiliary systems. |
| 3.3.1-95 | Steel and aluminum piping, piping components, and piping elements exposed to air – indoor controlled (external) | None | None | NA - No AEM or AMP | Not applicable. There are no steel or aluminum components exposed to indoor air controlled in the auxiliary systems. All indoor air environments are conservatively considered to be uncontrolled. |

| Table 3.3.1: Auxiliary Systems, NUREG-1801 Vol. 1 | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 3.3.1-96 | Steel and stainless steel piping, piping components, and piping elements in concrete | None | None | NA - No AEM or AMP | 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 - No AEM or AMP | 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 - No AEM or AMP | 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 - No AEM or AMP | Consistent with NUREG-1801 for stainless steel components. There are no copper alloy components exposed to air with borated water leakage in the auxiliary systems. |

**<u>Notes for Tables 3.3.2-1-IP2 through 3.3.2-19-62-IP3</u>**

<u>Generic Notes</u>

A. Consistent with NUREG-1801 item for component, material, environment, aging effect and aging management program. AMP is consistent with NUREG-1801 AMP.

B. Consistent with NUREG-1801 item for component, material, environment, aging effect and aging management program. AMP has exceptions to NUREG-1801 AMP.

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

D. Component is different, but consistent with NUREG-1801 item for material, environment, aging effect and aging management program. AMP has exceptions to NUREG-1801 AMP.

E. Consistent with NUREG-1801 material, environment, and aging effect but a different aging management program is credited.

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.

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

J. Neither the component nor the material and environment combination is evaluated in NUREG-1801.

<u>Plant-Specific Notes</u>

301. The air – treated environment is the equivalent of dried air and for the purposes of evaluating aluminum components, the air – treated environment is drier than the NUREG-1801 defined air – indoor uncontrolled.

302. This treated water environment is similar or equivalent to closed cycle cooling water or secondary coolant. For the purposes of evaluating the aging effect of cracking due to fatigue, this environment may be compared to treated borated water.

303. This treated water environment includes water that has been treated but is not maintained by a chemistry control program, such as water from the city water system. It is conservatively considered raw water for this comparison.

304. This treated water environment is controlled by the Water Chemistry Control – Auxiliary Systems Program. Although this environment does not directly compare with any NUREG-1801 defined environment, it approximates the NUREG-1801 defined closed cycle cooling water environment.

305. This treated water environment includes water that has been treated but is not maintained by a chemistry control program, such as water from the city water system. There is no environment in NUREG-1801 that will support a useful comparison for this line.

306. Changes of material properties and cracking in elastomers are results of exposure to ultra-violet light or elevated temperatures (> 95°F). The interior surfaces of these components are not exposed to ultra-violet light and are part of the air intake that is not exposed to elevated temperatures.

307. This treated water environment is the jacket cooling water for the ARDG or the EDG.

308. This treated water environment is closed cycle cooling water.

309. This steam or treated water environment is controlled by the Water Chemistry Control – Auxiliary Systems Program. Although this environment does not directly compare with any NUREG-1801 defined environment, it is considered the equivalent of steam or treated water for the evaluation of cracking due to fatigue.

310. These components remain at high temperature during normal operation which precludes moisture condensation and the resulting corrosion.

311. This treated water environment is controlled by the Water Chemistry Control – Auxiliary Systems Program. Although this environment does not directly compare with any NUREG-1801 defined environment, it is considered the equivalent of treated water for the evaluation of loss of material due to flow accelerated corrosion.

312. This environment is steam produced from treated water that is controlled by the Water Chemistry Control – Auxiliary Systems Program. Although this environment does not directly compare with any NUREG-1801 defined environment, the steam is considered equivalent to the NUREG-1801 steam environment for this comparison.

313. The tank is steel with a corrosion-resistant coating on the wetted surfaces (AMERCOAT 55 System).

314. The One-Time Inspection Program will verify effectiveness of the Water Chemistry Control – Primary and Secondary Program.

315. This line includes the nonregenerative heat exchanger.

316. The One-Time Inspection Program will verify effectiveness of the Oil Analysis and Diesel Fuel Monitoring Programs.

317. This component is part of the emergency fuel oil trailer transfer tank.

318. This treated water environment includes chemical solutions used to control primary and secondary system water chemistry or as an additive for containment spray.

## Table 3.3.2-1-IP2
## Spent Fuel Pit Cooling System
## Summary of Aging Management Review

**Table 3.3.2-1-IP2: Spent Fuel Pit Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Neutron absorber (boraflex) | Neutron absorption | Boron carbide_/ elastomer | Treated borated water | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A2-4<br>(A-86) | 3.3.1-87 | E |
| Neutron absorber (boraflex) | Neutron absorption | Boron carbide_/ elastomer | Treated borated water | Change in material properties | Boraflex Monitoring | VII.A2-4<br>(A-86) | 3.3.1-87 | B |
| Neutron absorber (boraflex) | Neutron absorption | Boron carbide_/ elastomer | Treated borated water | Cracking | Water Chemistry Control – Primary and Secondary | VII.A2-4<br>(A-86) | 3.3.1-87 | E |

# Table 3.3.2-1-IP3
# Spent Fuel Pit Cooling System
# Summary of Aging Management Review

**Table 3.3.2-1-IP3: Spent Fuel Pit Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Neutron absorber (boral) | Neutron absorption | Boron carbide / aluminum | Treated borated water | Loss of material | Boral Surveillance<br>Water Chemistry Control – Primary and Secondary | VII.A2-5<br>(A-88) | 3.3.1-13 | E |

# Table 3.3.2-2-IP2
# Service Water System
# Summary of Aging Management Review

**Table 3.3.2-2-IP2: Service Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | Bolting Integrity | VII.D-1<br>(A-103) | 3.3.1-44 | C |
| Bolting | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | Bolting Integrity | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Bolting | Pressure boundary | Stainless steel | Raw water (ext) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | C |
| Expansion joint | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Expansion joint | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Flow element | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Flow element | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |

| Table 3.3.2-2-IP2: Service Water System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-5<br>(A-64) | 3.3.1-77 | A |
| Heat exchanger (shell) | Pressure boundary | Titanium | Condensation (ext) | None | None | -- | -- | F |
| Heat exchanger (shell) | Pressure boundary | Titanium | Raw water (int) | Cracking | Service Water Integrity | -- | -- | F |
| Heat exchanger (shell) | Pressure boundary | Titanium | Raw water (int) | Loss of material | Service Water Integrity | -- | -- | F |
| Heat exchanger (tubes) | Heat transfer | Titanium | Raw water (ext) | Fouling | Service Water Integrity | -- | -- | F |
| Heat exchanger (tubes) | Heat transfer | Titanium | Raw water (int) | Fouling | Service Water Integrity | -- | -- | F |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-3<br>(A-65) | 3.3.1-82 | A |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | D |

**Table 3.3.2-2-IP2: Service Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Treated water (ext) | Loss of material – wear | Service Water Integrity | -- | -- | H |
| Heat exchanger (tubes) | Pressure boundary | Titanium | Raw water (ext) | Loss of material | Service Water Integrity | -- | -- | F |
| Heat exchanger (tubes) | Pressure boundary | Titanium | Raw water (int) | Cracking | Service Water Integrity | -- | -- | F |
| Heat exchanger (tubes) | Pressure boundary | Titanium | Raw water (int) | Loss of material | Service Water Integrity | -- | -- | F |
| Heat exchanger (tubes) | Pressure boundary | Titanium | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | -- | -- | F |
| Indicator | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1 (A-09) | 3.3.1-27 | E |
| Indicator | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15 (A-54) | 3.3.1-79 | A |
| Mixer | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1 (A-09) | 3.3.1-27 | E |
| Mixer | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15 (A-54) | 3.3.1-79 | A |

**Table 3.3.2-2-IP2: Service Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Orifice | Pressure boundary<br>Flow control | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Orifice | Pressure boundary<br>Flow control | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Piping | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | External Surfaces Monitoring | VII.F1-3<br>(A-08) | 3.3.1-72 | E |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Piping | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.C1-18<br>(A-01) | 3.3.1-19 | A |
| Piping | Pressure boundary | Copper alloy | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Piping | Pressure boundary | Copper alloy | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-9<br>(A-44) | 3.3.1-81 | A |
| Piping | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |

**Table 3.3.2-2-IP2: Service Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15 (A-54) | 3.3.1-79 | A |
| Pump casing | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1 (A-09) | 3.3.1-27 | E |
| Pump casing | Pressure boundary | Stainless steel | Raw water (ext) | Loss of material | Service Water Integrity | VII.C1-15 (A-54) | 3.3.1-79 | A |
| Pump casing | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15 (A-54) | 3.3.1-79 | A |
| Strainer | Filtration | Stainless steel | Raw water (ext) | Loss of material | Service Water Integrity | VII.C1-15 (A-54) | 3.3.1-79 | A |
| Strainer | Filtration | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15 (A-54) | 3.3.1-79 | A |
| Strainer housing | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11 (A-81) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19 (A-38) | 3.3.1-76 | A |
| Thermowell | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11 (A-81) | 3.3.1-58 | A |
| Thermowell | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19 (A-38) | 3.3.1-76 | A |

**Table 3.3.2-2-IP2: Service Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Thermowell | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Tubing | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Tubing | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Tubing | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Tubing | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Valve body | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Valve body | Pressure boundary | Copper alloy | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Valve body | Pressure boundary | Copper alloy | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-9<br>(A-44) | 3.3.1-81 | A |

**Table 3.3.2-2-IP2: Service Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Raw water (int) | Loss of material | Selective Leaching | VII.C1-10<br>(A-47) | 3.3.1-84 | A |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-9<br>(A-44) | 3.3.1-81 | A |
| Valve body | Pressure boundary | Gray cast iron | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Raw water (int) | Loss of material | Selective Leaching | VII.C1-11<br>(A-51) | 3.3.1-85 | A |
| Valve body | Pressure boundary | Gray cast iron | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Valve body | Pressure boundary | Nickel alloy | Condensation (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Valve body | Pressure boundary | Nickel alloy | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-13<br>(AP-53) | 3.3.1-78 | A |
| Valve body | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Valve body | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |

| **Table 3.3.2-2-IP2: Service Water System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary<br>Flow control | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Valve body | Pressure boundary<br>Flow control | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Valve body | Pressure boundary<br>Flow control | Nickel alloy | Condensation (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Valve body | Pressure boundary<br>Flow control | Nickel alloy | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-13<br>(AP-53) | 3.3.1-78 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |

# Table 3.3.2-2-IP3
# Service Water System
# Summary of Aging Management Review

**Table 3.3.2-2-IP3: Service Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | Bolting Integrity | VII.D-1<br>(A-103) | 3.3.1-44 | C |
| Bolting | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | Bolting Integrity | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Bolting | Pressure boundary | Stainless steel | Raw water (ext) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | C |
| Expansion joint | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Expansion joint | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Flow element | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Flow element | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |

**Table 3.3.2-2-IP3: Service Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-5<br>(A-64) | 3.3.1-77 | A |
| Heat exchanger (shell) | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Heat exchanger (shell) | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Heat exchanger (tubes) | Heat transfer | Stainless steel | Raw water (ext) | Fouling | Service Water Integrity | VII.C1-7<br>(AP-61) | 3.3.1-83 | A |
| Heat exchanger (tubes) | Heat transfer | Stainless steel | Raw water (int) | Fouling | Service Water Integrity | VII.C1-7<br>(AP-61) | 3.3.1-83 | A |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-3<br>(A-65) | 3.3.1-82 | A |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | D |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Treated water (ext) | Loss of material – wear | Heat Exchanger Monitoring | -- | -- | H |

| **Table 3.3.2-2-IP3: Service Water System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Indicator | Pressure boundary | Glass | Condensation (ext) | None | None | -- | -- | G |
| Indicator | Pressure boundary | Glass | Raw water (int) | None | None | VII.J-11<br>(AP-50) | 3.3.1-93 | A |
| Indicator | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Indicator | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Mixer | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Mixer | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Orifice | Pressure boundary<br>Flow control | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Orifice | Pressure boundary<br>Flow control | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Piping | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | External Surfaces Monitoring | VII.F1-3<br>(A-08) | 3.3.1-72 | E |

**Table 3.3.2-2-IP3: Service Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Piping | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.C1-18<br>(A-01) | 3.3.1-19 | A |
| Piping | Pressure boundary | Copper alloy | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Piping | Pressure boundary | Copper alloy | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-9<br>(A-44) | 3.3.1-81 | A |
| Piping | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Piping | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Pump casing | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Raw water (ext) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Pump casing | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Pump casing | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |

| Table 3.3.2-2-IP3: Service Water System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Pump casing | Pressure boundary | Stainless steel | Raw water (ext) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Pump casing | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Strainer | Filtration | Stainless steel | Raw water (ext) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Strainer | Filtration | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Strainer housing | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Thermowell | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Thermowell | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Thermowell | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Thermowell | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |

| Table 3.3.2-2-IP3: Service Water System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Tubing | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Tubing | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Tubing | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Valve body | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Valve body | Pressure boundary | Copper alloy | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Valve body | Pressure boundary | Copper alloy | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-9<br>(A-44) | 3.3.1-81 | A |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Raw water (int) | Loss of material | Selective Leaching | VII.C1-10<br>(A-47) | 3.3.1-84 | A |

**Table 3.3.2-2-IP3: Service Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-9<br>(A-44) | 3.3.1-81 | A |
| Valve body | Pressure boundary | Nickel alloy | Condensation (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Valve body | Pressure boundary | Nickel alloy | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-13<br>(AP-53) | 3.3.1-78 | A |
| Valve body | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Valve body | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Valve body | Pressure boundary<br>Flow control | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Valve body | Pressure boundary<br>Flow control | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Valve body | Pressure boundary<br>Flow control | Copper alloy > 15% Zn | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Valve body | Pressure boundary<br>Flow control | Copper alloy > 15% Zn | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-9<br>(A-44) | 3.3.1-81 | A |

**Table 3.3.2-2-IP3: Service Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary<br>Flow control | Nickel alloy | Condensation (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Valve body | Pressure boundary<br>Flow control | Nickel alloy | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-13<br>(AP-53) | 3.3.1-78 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |

# Table 3.3.2-3-IP2
# Component Cooling Water
# Summary of Aging Management Review

**Table 3.3.2-3-IP2: Component Cooling Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Flex hose | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flex hose | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-5<br>(A-64) | 3.3.1-77 | C |

**Table 3.3.2-3-IP2: Component Cooling Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | B |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-10<br>(A-79) | 3.3.1-89 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-10<br>(AP-41) | 3.3.1-59 | C |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | B |
| Heat exchanger (shell) | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Heat exchanger (shell) | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E3-1<br>(A-67) | 3.3.1-49 | D |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn (inhibited) | Raw water (int) | Fouling | Service Water Integrity | VII.C1-6<br>(A-72) | 3.3.1-83 | C |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn (inhibited) | Treated water (ext) | Fouling | Water Chemistry Control – Closed Cooling Water | VII.C2-2<br>(AP-80) | 3.3.1-52 | B |

**Table 3.3.2-3-IP2: Component Cooling Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-3<br>(A-65) | 3.3.1-82 | C |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | D |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Treated water (ext) | Loss of material – wear | Heat Exchanger Monitoring | -- | -- | H |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Treated water (ext) | Loss of material – wear | Service Water Integrity | -- | -- | H |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | D |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | C |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |

| Table 3.3.2-3-IP2: Component Cooling Water | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E3-1<br>(A-67) | 3.3.1-49 | D |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material – wear | Heat Exchanger Monitoring | -- | -- | H |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-3<br>(S-39) | 3.4.1-14 | C, 314 |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-36<br>(S-22) | 3.4.1-16 | C, 314 |
| Heat exchanger (tubesheet) | Pressure boundary | Aluminum bronze | Raw water (int) | Loss of material | Selective Leaching | -- | -- | F |
| Heat exchanger (tubesheet) | Pressure boundary | Aluminum bronze | Raw water (int) | Loss of material | Service Water Integrity | -- | -- | F |
| Heat exchanger (tubesheet) | Pressure boundary | Aluminum bronze | Treated water (ext) | Loss of material | Selective Leaching | -- | -- | F |
| Heat exchanger (tubesheet) | Pressure boundary | Aluminum bronze | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | -- | -- | F |

| Table 3.3.2-3-IP2: Component Cooling Water | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Orifice | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Orifice | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Pump casing | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

| Table 3.3.2-3-IP2: Component Cooling Water | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Pump casing | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.C2-8<br>(A-50) | 3.3.1-85 | A |
| Pump casing | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Thermowell | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |

| Table 3.3.2-3-IP2: Component Cooling Water | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-4<br>(AP-12) | 3.3.1-51 | B |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Closed Cooling Water | VII.C2-11<br>(AP-60) | 3.3.1-46 | B |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

| Table 3.3.2-3-IP2: Component Cooling Water | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | CASS | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |

# Table 3.3.2-3-IP3
# Component Cooling Water
# Summary of Aging Management Review

**Table 3.3.2-3-IP3: Component Cooling Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Flex hose | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flex hose | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-5<br>(A-64) | 3.3.1-77 | C |

**Table 3.3.2-3-IP3: Component Cooling Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | B |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-10<br>(A-79) | 3.3.1-89 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-10<br>(AP-41) | 3.3.1-59 | C |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | B |
| Heat exchanger (shell) | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Heat exchanger (shell) | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E3-1<br>(A-67) | 3.3.1-49 | D |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn (inhibited) | Raw water (int) | Fouling | Service Water Integrity | VII.C1-6<br>(A-72) | 3.3.1-83 | C |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn (inhibited) | Treated water (ext) | Fouling | Water Chemistry Control – Closed Cooling Water | VII.C2-2<br>(AP-80) | 3.3.1-52 | B |

| **Table 3.3.2-3-IP3: Component Cooling Water** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-3<br>(A-65) | 3.3.1-82 | C |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | D |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Treated water (ext) | Loss of material – wear | Heat Exchanger Monitoring | -- | -- | H |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Treated water (ext) | Loss of material – wear | Service Water Integrity | -- | -- | H |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | D |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | C |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |

| Table 3.3.2-3-IP3: Component Cooling Water | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E3-1<br>(A-67) | 3.3.1-49 | D |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material – wear | Heat Exchanger Monitoring | -- | -- | H |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-3<br>(S-39) | 3.4.1-14 | C, 314 |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-36<br>(S-22) | 3.4.1-16 | C, 314 |
| Orifice | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Orifice | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |

**Table 3.3.2-3-IP3: Component Cooling Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Pump casing | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.C2-8<br>(A-50) | 3.3.1-85 | A |
| Pump casing | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |

**Table 3.3.2-3-IP3: Component Cooling Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Thermowell | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-4<br>(AP-12) | 3.3.1-51 | B |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Closed Cooling Water | VII.C2-11<br>(AP-60) | 3.3.1-46 | B |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |

| Table 3.3.2-3-IP3: Component Cooling Water | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | CASS | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |

# Table 3.3.2-4-IP2
# Compressed Air
# Summary of Aging Management Review

**Table 3.3.2-4-IP2: Compressed Air**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Flex hose | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flex hose | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18<br>(AP-20) | 3.3.1-98 | A, 301 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Piping | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |
| Piping | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.D-2<br>(A-26) | 3.3.1-53 | E |
| Piping | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |

**Table 3.3.2-4-IP2: Compressed Air**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Copper alloy | Air – treated (int) | None | None | VII.J-3<br>(AP-8) | 3.3.1-98 | A, 301 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18<br>(AP-20) | 3.3.1-98 | A, 301 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |
| Tubing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Tubing | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Air – treated (int) | None | None | VII.J-3<br>(AP-8) | 3.3.1-98 | A, 301 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

| Table 3.3.2-4-IP2: Compressed Air | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18<br>(AP-20) | 3.3.1-98 | A, 301 |
| Valve body | Pressure boundary | Aluminum | Air – indoor (ext) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Valve body | Pressure boundary | Aluminum | Air – treated (int) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C, 301 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Valve body | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Air – treated (int) | None | None | VII.J-3<br>(AP-8) | 3.3.1-98 | A, 301 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – treated (int) | None | None | VII.J-3<br>(AP-8) | 3.3.1-98 | A, 301 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

| **Table 3.3.2-4-IP2: Compressed Air** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18 (AP-20) | 3.3.1-98 | A, 301 |
| Valve body | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | VII.D-4 (AP-81) | 3.3.1-54 | E |

# Table 3.3.2-4-IP3
# Compressed Air
# Summary of Aging Management Review

| Table 3.3.2-4-IP3: Compressed Air | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Flex hose | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flex hose | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18<br>(AP-20) | 3.3.1-98 | A, 301 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Piping | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |
| Piping | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.D-2<br>(A-26) | 3.3.1-53 | E |
| Piping | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |

**Table 3.3.2-4-IP3: Compressed Air**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Copper alloy | Air – treated (int) | None | None | VII.J-3<br>(AP-8) | 3.3.1-98 | A, 301 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18<br>(AP-20) | 3.3.1-98 | A, 301 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |
| Tubing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Tubing | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Air – treated (int) | None | None | VII.J-3<br>(AP-8) | 3.3.1-98 | A, 301 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

**Table 3.3.2-4-IP3: Compressed Air**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18<br>(AP-20) | 3.3.1-98 | A, 301 |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Air – treated (int) | None | None | VII.J-3<br>(AP-8) | 3.3.1-98 | A, 301 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – treated (int) | None | None | VII.J-3<br>(AP-8) | 3.3.1-98 | A, 301 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18<br>(AP-20) | 3.3.1-98 | A, 301 |
| Valve body | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | VII.D-4<br>(AP-81) | 3.3.1-54 | E |

# Table 3.3.2-5-IP2
# Nitrogen System
# Summary of Aging Management Review

**Table 3.3.2-5-IP2: Nitrogen System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Flex hose | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flex hose | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |
| Flow element | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flow element | Pressure boundary<br>Flow control | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |

| Table 3.3.2-5-IP2: Nitrogen System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Piping | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |
| Regulator | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Regulator | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Regulator | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Regulator | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |
| Strainer | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Strainer | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |

**Table 3.3.2-5-IP2: Nitrogen System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tank | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |

| **Table 3.3.2-5-IP2: Nitrogen System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |

# Table 3.3.2-5-IP3
# Nitrogen System
# Summary of Aging Management Review

**Table 3.3.2-5-IP3: Nitrogen Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4 (AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | C |
| Flex hose | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Flex hose | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19 (AP-22) | 3.3.1-97 | A |
| Orifice | Flow control | Stainless steel | Gas (int) | None | None | VII.J-19 (AP-22) | 3.3.1-97 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8 (A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23 (AP-6) | 3.3.1-97 | A |
| Piping | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3 (EP-10) | 3.2.1-53 | C |

**Table 3.3.2-5-IP3: Nitrogen Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-5-IP3: Nitrogen Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23 (AP-6) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3 (EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4 (AP-9) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Gas (int) | None | None | VII.J-4 (AP-9) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19 (AP-22) | 3.3.1-97 | A |

# Table 3.3.2-6-IP2
# Chemical and Volume Control
# Summary of Aging Management Review

**Table 3.3.2-6-IP2: Chemical and Volume Control**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | C |
| Filter housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Filter housing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Filter housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Filter housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |

| **Table 3.3.2-6-IP2: Chemical and Volume Control** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Flow element | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Flow element | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Flow element | Pressure boundary<br>Flow control | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Flow element | Pressure boundary<br>Flow control | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Fluid drive housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Fluid drive housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.E1-19<br>(AP-30) | 3.3.1-14 | B, 316 |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.E1-1<br>(A-79) | 3.3.1-89 | A |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-10<br>(AP-41) | 3.3.1-59 | C |

| Table 3.3.2-6-IP2:  Chemical and Volume Control | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-6<br>(A-63) | 3.3.1-48 | B |
| Heat exchanger (bonnet) | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.E1-1<br>(A-79) | 3.3.1-89 | A |
| Heat exchanger (bonnet) | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (bonnet) | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.C2-8<br>(A-50) | 3.3.1-85 | C, 308 |
| Heat exchanger (bonnet) | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-6<br>(A-63) | 3.3.1-48 | B |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.E1-1<br>(A-79) | 3.3.1-89 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-10<br>(AP-41) | 3.3.1-59 | C |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-5<br>(AP-39) | 3.3.1-21 | D, 316 |

| Table 3.3.2-6-IP2: Chemical and Volume Control | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-6<br>(A-63) | 3.3.1-48 | B |
| Heat exchanger (shell) | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-12<br>(AP-66) | 3.3.1-88 | C |
| Heat exchanger (shell) | Pressure boundary | Copper alloy > 15% Zn | Lube oil (int) | Loss of material | Oil Analysis | VII.E1-12<br>(AP-47) | 3.3.1-26 | D, 316 |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Lube oil (ext) | Fouling | Oil Analysis | V.A-12<br>(EP-47) | 3.2.1-9 | D, 316 |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Treated water (int) | Fouling | Water Chemistry Control – Closed Cooling Water | VII.C2-2<br>(AP-80) | 3.3.1-52 | D |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Lube oil (ext) | Loss of material | Oil Analysis | VII.E1-12<br>(AP-47) | 3.3.1-26 | D, 316 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Lube oil (ext) | Loss of material – wear | Heat Exchanger Monitoring | -- | -- | H |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | B |

**Table 3.3.2-6-IP2: Chemical and Volume Control**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-9<br>(A-69)<br>VII.E1-5<br>(A-84) | 3.3.1-7<br>3.3.1-8 | E, 315<br>E |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E3-1<br>(A-67) | 3.3.1-49 | D |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material – wear | Heat Exchanger Monitoring | -- | -- | H |
| Heat exchanger (tubesheet) | Pressure boundary | Copper alloy > 15% Zn | Lube oil (ext) | Loss of material | Oil Analysis | VII.E1-12<br>(AP-47) | 3.3.1-26 | D, 316 |
| Heat exchanger (tubesheet) | Pressure boundary | Copper alloy > 15% Zn | Treated water (ext) | Loss of material | Selective Leaching | VII.E1-13<br>(AP-43) | 3.3.1-84 | A, 308 |
| Heat exchanger (tubesheet) | Pressure boundary | Copper alloy > 15% Zn | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | B |

**Table 3.3.2-6-IP2: Chemical and Volume Control**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Piping | Pressure boundary | Copper alloy > 15% Zn | Lube oil (ext) | Loss of material | Oil Analysis | VII.E1-12<br>(AP-47) | 3.3.1-26 | B, 316 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Piping | Pressure boundary | Stainless steel | Lube oil (ext) | Loss of material | Oil Analysis | VII.E1-15<br>(AP-59) | 3.3.1-33 | B, 316 |
| Piping | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Pulsation dampener housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |

| Table 3.3.2-6-IP2: Chemical and Volume Control | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Pulsation dampener housing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water (int) | Cracking – fatigue | Periodic Surveillance and Preventive Maintenance | VII.E1-7<br>(A-76) | 3.3.1-9 | E |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Strainer housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Strainer housing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |

| **Table 3.3.2-6-IP2: Chemical and Volume Control** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Strainer housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Strainer housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Tank | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Tank | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Tank | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Thermowell | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |

**Table 3.3.2-6-IP2: Chemical and Volume Control**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Lube oil (int) | Loss of material | Oil Analysis | VII.E1-12<br>(AP-47) | 3.3.1-26 | B, 316 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Tubing | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.E1-15<br>(AP-59) | 3.3.1-33 | B, 316 |
| Tubing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

| Table 3.3.2-6-IP2: Chemical and Volume Control | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.E1-19<br>(AP-30) | 3.3.1-14 | B, 316 |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Valve body | Pressure boundary | CASS | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Valve body | Pressure boundary | CASS | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Valve body | Pressure boundary | CASS | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Lube oil (int) | Loss of material | Oil Analysis | VII.E1-12<br>(AP-47) | 3.3.1-26 | B, 316 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |

| Table 3.3.2-6-IP2: Chemical and Volume Control | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |

# Table 3.3.2-6-IP3
# Chemical and Volume Control
# Summary of Aging Management Review

| Table 3.3.2-6-IP3: Chemical and Volume Control | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | C |
| Filter housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Filter housing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Filter housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Filter housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |

**Table 3.3.2-6-IP3: Chemical and Volume Control**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flow element | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Flow element | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Flow element | Pressure boundary<br>Flow control | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Flow element | Pressure boundary<br>Flow control | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Fluid drive housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Fluid drive housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.E1-19<br>(AP-30) | 3.3.1-14 | B, 316 |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.E1-1<br>(A-79) | 3.3.1-89 | A |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-10<br>(AP-41) | 3.3.1-59 | C |

**Table 3.3.2-6-IP3: Chemical and Volume Control**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-6<br>(A-63) | 3.3.1-48 | B |
| Heat exchanger (bonnet) | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.E1-1<br>(A-79) | 3.3.1-89 | A |
| Heat exchanger (bonnet) | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (bonnet) | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.C2-8<br>(A-50) | 3.3.1-85 | C, 308 |
| Heat exchanger (bonnet) | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-6<br>(A-63) | 3.3.1-48 | B |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.E1-1<br>(A-79) | 3.3.1-89 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-10<br>(AP-41) | 3.3.1-59 | C |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-5<br>(AP-39) | 3.3.1-21 | D, 316 |

**Table 3.3.2-6-IP3: Chemical and Volume Control**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-6<br>(A-63) | 3.3.1-48 | B |
| Heat exchanger (shell) | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-12<br>(AP-66) | 3.3.1-88 | C |
| Heat exchanger (shell) | Pressure boundary | Copper alloy > 15% Zn | Lube oil (int) | Loss of material | Oil Analysis | VII.E1-12<br>(AP-47) | 3.3.1-26 | D, 316 |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Lube oil (ext) | Fouling | Oil Analysis | V.A-12<br>(EP-47) | 3.2.1-9 | D, 316 |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Treated water (int) | Fouling | Water Chemistry Control – Closed Cooling Water | VII.C2-2<br>(AP-80) | 3.3.1-52 | D |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Lube oil (ext) | Loss of material | Oil Analysis | VII.E1-12<br>(AP-47) | 3.3.1-26 | D, 316 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Lube oil (ext) | Loss of material – wear | Heat Exchanger Monitoring | -- | -- | H |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | B |

**Table 3.3.2-6-IP3: Chemical and Volume Control**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-9<br>(A-69)<br>VII.E1-5<br>(A-84) | 3.3.1-7<br>3.3.1-8 | E, 315<br>E |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E3-1<br>(A-67) | 3.3.1-49 | D |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material – wear | Heat Exchanger Monitoring | -- | -- | H |
| Heat exchanger (tubesheet) | Pressure boundary | Copper alloy > 15% Zn | Lube oil (ext) | Loss of material | Oil Analysis | VII.E1-12<br>(AP-47) | 3.3.1-26 | D, 316 |
| Heat exchanger (tubesheet) | Pressure boundary | Copper alloy > 15% Zn | Treated water (ext) | Loss of material | Selective Leaching | VII.E1-13<br>(AP-43) | 3.3.1-84 | A, 308 |
| Heat exchanger (tubesheet) | Pressure boundary | Copper alloy > 15% Zn | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | B |

| **Table 3.3.2-6-IP3: Chemical and Volume Control** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Piping | Pressure boundary | Copper alloy > 15% Zn | Lube oil (int) | Loss of material | Oil Analysis | VII.E1-12<br>(AP-47) | 3.3.1-26 | B, 316 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Piping | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.E1-15<br>(AP-59) | 3.3.1-33 | B, 316 |
| Piping | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |

**Table 3.3.2-6-IP3: Chemical and Volume Control**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Pump casing | Pressure boundary | Stainless steel | Treated borated water (int) | Cracking – fatigue | Periodic Surveillance and Preventive Maintenance | VII.E1-7<br>(A-76) | 3.3.1-9 | E |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Tank | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Tank | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Tank | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |

**Table 3.3.2-6-IP3: Chemical and Volume Control**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Lube oil (int) | Loss of material | Oil Analysis | VII.E1-12<br>(AP-47) | 3.3.1-26 | B, 316 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Tubing | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.E1-15<br>(AP-59) | 3.3.1-33 | B, 316 |
| Tubing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |

| **Table 3.3.2-6-IP3: Chemical and Volume Control** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | CASS | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Valve body | Pressure boundary | CASS | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Valve body | Pressure boundary | CASS | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | A |
| Valve body | Pressure boundary | CASS | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | A |

**Table 3.3.2-6-IP3: Chemical and Volume Control**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |

# Table 3.3.2-7-IP2
# Primary Water Makeup System
# Summary of Aging Management Review

**Table 3.3.2-7-IP2: Primary Water Makeup System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | VII.I-1<br>(AP-28) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Bolting | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | -- | -- | G |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flow element | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Flow element | Pressure boundary<br>Flow control | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | -- | -- | G |

| Table 3.3.2-7-IP2: Primary Water Makeup System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | -- | -- | G |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-36 (S-22) | 3.4.1-16 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4 (SP-16) | 3.4.1-16 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4 (SP-16) | 3.4.1-16 | C, 314 |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4 (SP-16) | 3.4.1-16 | C, 314 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8 (AP-14) | 3.3.1-93 | A |

| **Table 3.3.2-7-IP2: Primary Water Makeup System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-13<br>(AP-51) | 3.3.1-93 | A |
| Strainer housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Strainer housing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Tank | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Tank | Pressure boundary | Stainless steel | Concrete (ext) | None | None | VII.J-17<br>(AP-19) | 3.3.1-96 | A |
| Tank | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-40<br>(S-13) | 3.4.1-6 | C, 314 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

**Table 3.3.2-7-IP2: Primary Water Makeup System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |

# Table 3.3.2-7-IP3
# Primary Water Makeup System
# Summary of Aging Management Review

**Table 3.3.2-7-IP3: Primary Water Makeup System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | VII.I-1<br>(AP-28) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Bolting | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | -- | -- | G |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flow element | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Flow element | Pressure boundary<br>Flow control | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | -- | -- | G |

| Table 3.3.2-7-IP3: Primary Water Makeup System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | -- | -- | G |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-36<br>(S-22) | 3.4.1-16 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-13<br>(AP-51) | 3.3.1-93 | A |
| Strainer housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

| **Table 3.3.2-7-IP3: Primary Water Makeup System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Strainer housing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Tank | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Tank | Pressure boundary | Stainless steel | Concrete (ext) | None | None | VII.J-17<br>(AP-19) | 3.3.1-96 | A |
| Tank | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-40<br>(S-13) | 3.4.1-6 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-5<br>(SP-61) | 3.4.1-15 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

**Table 3.3.2-7-IP3: Primary Water Makeup System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |

## Table 3.3.2-8-IP2
## Heating, Ventilation and Cooling
## Summary of Aging Management Review

**Table 3.3.2-8-IP2: Heating, Ventilation and Cooling**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-4<br>(A-105) | 3.3.1-55 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Damper housing | Pressure boundary | Aluminum | Air – indoor (ext) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Damper housing | Pressure boundary | Aluminum | Air – indoor (int) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Damper housing | Pressure boundary | Aluminum | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-2<br>(A-10) | 3.3.1-56 | A |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Damper housing | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |

| Table 3.3.2-8-IP2: Heating, Ventilation and Cooling | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Duct | Pressure boundary | Aluminum | Air – indoor (ext) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Duct | Pressure boundary | Aluminum | Air – indoor (int) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Duct | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-2<br>(A-10) | 3.3.1-56 | A |
| Duct | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Duct | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Duct | Pressure boundary | Elastomer | Air – indoor (ext) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F2-7<br>(A-17) | 3.3.1-11 | E |
| Duct | Pressure boundary | Elastomer | Air – indoor (ext) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F2-7<br>(A-17) | 3.3.1-11 | E |
| Duct | Pressure boundary | Elastomer | Air – indoor (int) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F2-7<br>(A-17) | 3.3.1-11 | E |
| Duct | Pressure boundary | Elastomer | Air – indoor (int) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F2-7<br>(A-17) | 3.3.1-11 | E |

**Table 3.3.2-8-IP2: Heating, Ventilation and Cooling**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Duct | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Duct | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (ext) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F2-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (ext) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F2-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (int) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F2-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (int) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F2-7<br>(A-17) | 3.3.1-11 | E |
| Fan housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-2<br>(A-10) | 3.3.1-56 | A |
| Fan housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F2-2<br>(A-10) | 3.3.1-56 | E |
| Fan housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |

**Table 3.3.2-8-IP2: Heating, Ventilation and Cooling**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Fan housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Fan housing | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-2<br>(A-10) | 3.3.1-56 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Tubing | Pressure boundary | Aluminum | Air – indoor (ext) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Tubing | Pressure boundary | Aluminum | Air – indoor (int) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (int) | None | None | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |

| Table 3.3.2-8-IP2: Heating, Ventilation and Cooling | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-2<br>(A-10) | 3.3.1-56 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |

# Table 3.3.2-8-IP3
# Heating, Ventilation and Cooling
# Summary of Aging Management Review

**Table 3.3.2-8-IP3: Heating, Ventilation and Cooling**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-4<br>(A-105) | 3.3.1-55 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Damper housing | Pressure boundary | Aluminum | Air – indoor (ext) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Damper housing | Pressure boundary | Aluminum | Air – indoor (int) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Damper housing | Pressure boundary | Aluminum | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-2<br>(A-10) | 3.3.1-56 | A |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Damper housing | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |

**Table 3.3.2-8-IP3: Heating, Ventilation and Cooling**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Duct | Pressure boundary | Aluminum | Air – indoor (ext) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Duct | Pressure boundary | Aluminum | Air – indoor (int) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Duct | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-2<br>(A-10) | 3.3.1-56 | A |
| Duct | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Duct | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Duct | Pressure boundary | Elastomer | Air – indoor (ext) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F2-7<br>(A-17) | 3.3.1-11 | E |
| Duct | Pressure boundary | Elastomer | Air – indoor (ext) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F2-7<br>(A-17) | 3.3.1-11 | E |
| Duct | Pressure boundary | Elastomer | Air – indoor (int) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F2-7<br>(A-17) | 3.3.1-11 | E |
| Duct | Pressure boundary | Elastomer | Air – indoor (int) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F2-7<br>(A-17) | 3.3.1-11 | E |

| **Table 3.3.2-8-IP3: Heating, Ventilation and Cooling** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Duct | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Duct | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (ext) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F2-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (ext) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F2-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (int) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F2-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (int) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F2-7<br>(A-17) | 3.3.1-11 | E |
| Fan housing | Pressure boundary | Aluminum | Air – indoor (int) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Fan housing | Pressure boundary | Aluminum | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Fan housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F2-2<br>(A-10) | 3.3.1-56 | E |

**Table 3.3.2-8-IP3: Heating, Ventilation and Cooling**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Fan housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Fan housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-2<br>(A-10) | 3.3.1-56 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Tubing | Pressure boundary | Aluminum | Air – indoor (ext) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Tubing | Pressure boundary | Aluminum | Air – indoor (int) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (int) | None | None | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |

**Table 3.3.2-8-IP3: Heating, Ventilation and Cooling**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-2<br>(A-10) | 3.3.1-56 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |

# Table 3.3.2-9-IP2
# Containment Cooling and Filtration
# Summary of Aging Management Review

**Table 3.3.2-9-IP2: Containment Cooling and Filtration**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-4<br>(A-105) | 3.3.1-55 | A |
| Bolting | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | Bolting Integrity | VII.D-1<br>(A-103) | 3.3.1-44 | C |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Bolting | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | Bolting Integrity | VII.F3-1<br>(A-09) | 3.3.1-27 | E |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-2<br>(A-10) | 3.3.1-56 | A |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Duct | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-2<br>(A-10) | 3.3.1-56 | A |

**Table 3.3.2-9-IP2: Containment Cooling and Filtration**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Duct | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (ext) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F3-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (ext) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F3-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (int) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F3-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (int) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F3-7<br>(A-17) | 3.3.1-11 | E |
| Fan housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-2<br>(A-10) | 3.3.1-56 | A |
| Fan housing | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F3-3<br>(A-08) | 3.3.1-72 | E |
| Filter housing | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.I-11<br>(A-81) | 3.3.1-58 | A |

**Table 3.3.2-9-IP2: Containment Cooling and Filtration**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Filter housing | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F3-3<br>(A-08) | 3.3.1-72 | E |
| Heat exchanger (fins) | Heat transfer | Copper alloy | Condensation (ext) | Fouling | Service Water Integrity | -- | -- | H |
| Heat exchanger (header) | Pressure boundary | Titanium | Condensation (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | F |
| Heat exchanger (header) | Pressure boundary | Titanium | Raw water (int) | Loss of material | Service Water Integrity | -- | -- | F |
| Heat exchanger (housing) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F3-10<br>(AP-41) | 3.3.1-59 | E |
| Heat exchanger (housing) | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F3-3<br>(A-08) | 3.3.1-72 | E |
| Heat exchanger (tubes) | Heat transfer | Stainless steel | Condensation (ext) | Fouling | Service Water Integrity | -- | -- | G |
| Heat exchanger (tubes) | Heat transfer | Stainless steel | Raw water (int) | Fouling | Service Water Integrity | VII.C1-7<br>(AP-61) | 3.3.1-83 | C |

**Table 3.3.2-9-IP2: Containment Cooling and Filtration**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F3-1<br>(A-09) | 3.3.1-27 | E |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material – wear | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | C |
| Moisture separator | Filtration | Stainless steel | Condensation (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F3-1<br>(A-09) | 3.3.1-27 | E |
| Moisture separator | Filtration | Stainless steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F3-1<br>(A-09) | 3.3.1-27 | E |
| Nozzle | Flow control | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-2<br>(A-10) | 3.3.1-56 | A |
| Nozzle | Flow control | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (int) | None | None | -- | -- | G |

**Table 3.3.2-9-IP2: Containment Cooling and Filtration**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-2<br>(A-10) | 3.3.1-56 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (int) | None | None | -- | -- | G |

# Table 3.3.2-9-IP3
# Containment Cooling and Filtration
# Summary of Aging Management Review

| **Table 3.3.2-9-IP3: Containment Cooling and Filtration** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-4<br>(A-105) | 3.3.1-55 | A |
| Bolting | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | Bolting Integrity | VII.D-1<br>(A-103) | 3.3.1-44 | C |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Bolting | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | Bolting Integrity | VII.F3-1<br>(A-09) | 3.3.1-27 | E |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-2<br>(A-10) | 3.3.1-56 | A |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Damper housing | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F3-3<br>(A-08) | 3.3.1-72 | E |

**Table 3.3.2-9-IP3: Containment Cooling and Filtration**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Duct | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-2<br>(A-10) | 3.3.1-56 | A |
| Duct | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (ext) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F3-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (ext) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F3-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (int) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F3-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (int) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F3-7<br>(A-17) | 3.3.1-11 | E |
| Fan housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-2<br>(A-10) | 3.3.1-56 | A |
| Fan housing | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F3-3<br>(A-08) | 3.3.1-72 | E |

| **Table 3.3.2-9-IP3: Containment Cooling and Filtration** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Filter housing | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F3-1<br>(A-09) | 3.3.1-27 | E |
| Filter housing | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F3-1<br>(A-09) | 3.3.1-27 | E |
| Heat exchanger (fins) | Heat transfer | Copper alloy | Condensation (ext) | Fouling | Service Water Integrity | -- | -- | H |
| Heat exchanger (header) | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F3-1<br>(A-09) | 3.3.1-27 | E |
| Heat exchanger (header) | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | C |
| Heat exchanger (housing) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F3-10<br>(AP-41) | 3.3.1-59 | E |
| Heat exchanger (housing) | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F3-3<br>(A-08) | 3.3.1-72 | E |
| Heat exchanger (tubes) | Heat transfer | Stainless steel | Condensation (ext) | Fouling | Service Water Integrity | -- | -- | G |

| **Table 3.3.2-9-IP3: Containment Cooling and Filtration** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (tubes) | Heat transfer | Stainless steel | Raw water (int) | Fouling | Service Water Integrity | VII.C1-7<br>(AP-61) | 3.3.1-83 | C |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F3-1<br>(A-09) | 3.3.1-27 | E |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material – wear | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | C |
| Moisture separator | Filtration | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Moisture separator | Filtration | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Nozzle | Flow control | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-2<br>(A-10) | 3.3.1-56 | A |
| Nozzle | Flow control | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |

| Table 3.3.2-9-IP3: Containment Cooling and Filtration | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (int) | None | None | -- | -- | G |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-2<br>(A-10) | 3.3.1-56 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |

# Table 3.3.2-10-IP2
# Control Room Heating, Ventilation and Cooling
# Summary of Aging Management Review

| Table 3.3.2-10-IP2: Control Room Heating, Ventilation and Cooling | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-4<br>(A-105) | 3.3.1-55 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | VII.I-1<br>(AP-28) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-4<br>(A-105) | 3.3.1-55 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Bolting | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | -- | -- | G |
| Bolting | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Compressor housing | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Compressor housing | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |

| Table 3.3.2-10-IP2: Control Room Heating, Ventilation and Cooling | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-2<br>(A-10) | 3.3.1-56 | A |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Damper housing | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Drip pan | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-2<br>(A-10) | 3.3.1-56 | A |
| Drip pan | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F1-3<br>(A-08) | 3.3.1-72 | E |
| Duct | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-2<br>(A-10) | 3.3.1-56 | A |
| Duct | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Duct | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Duct | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F1-3<br>(A-08) | 3.3.1-72 | E |

| **Table 3.3.2-10-IP2: Control Room Heating, Ventilation and Cooling** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (ext) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F1-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (ext) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F1-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (int) | None | None | -- | -- | I, 306 |
| Duct flexible connection | Pressure boundary | Elastomer | Air – outdoor (ext) | Change in material properties | Periodic Surveillance and Preventive Maintenance | -- | -- | G |
| Duct flexible connection | Pressure boundary | Elastomer | Air – outdoor (ext) | Cracking | Periodic Surveillance and Preventive Maintenance | -- | -- | G |
| Fan housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-2<br>(A-10) | 3.3.1-56 | A |
| Fan housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Fan housing | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |

**Table 3.3.2-10-IP2: Control Room Heating, Ventilation and Cooling**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Filter housing | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Flow element | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Heat exchanger (fins) | Heat transfer | Aluminum | Air – outdoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |
| Heat exchanger (fins) | Heat transfer | Aluminum | Condensation (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Heat exchanger (housing) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-10<br>(AP-41) | 3.3.1-59 | A |
| Heat exchanger (housing) | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Heat exchanger (housing) | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |

| **Table 3.3.2-10-IP2: Control Room Heating, Ventilation and Cooling** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Air – outdoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Condensation (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | C |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Air – outdoor (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Condensation (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | C |
| Louver housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Louver housing | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |

**Table 3.3.2-10-IP2: Control Room Heating, Ventilation and Cooling**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Piping | Pressure boundary | Copper alloy | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Piping | Pressure boundary | Copper alloy | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Piping | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Tubing | Pressure boundary | Copper alloy | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Tubing | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Aluminum | Air – indoor (ext) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Valve body | Pressure boundary | Aluminum | Air – treated (int) | None | None | -- | -- | G |

**Table 3.3.2-10-IP2: Control Room Heating, Ventilation and Cooling**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Valve body | Pressure boundary | Copper alloy | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Valve body | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |

## Table 3.3.2-10-IP3
## Control Room Heating, Ventilation and Cooling
## Summary of Aging Management Review

**Table 3.3.2-10-IP3: Control Room Heating, Ventilation and Cooling**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-4<br>(A-105) | 3.3.1-55 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | VII.I-1<br>(AP-28) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-4<br>(A-105) | 3.3.1-55 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Bolting | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | -- | -- | G |
| Bolting | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Compressor housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-2<br>(A-10) | 3.3.1-56 | A |
| Compressor housing | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |

**Table 3.3.2-10-IP3: Control Room Heating, Ventilation and Cooling**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Compressor housing | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-2<br>(A-10) | 3.3.1-56 | A |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Damper housing | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Drip pan | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-2<br>(A-10) | 3.3.1-56 | A |
| Drip pan | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F1-3<br>(A-08) | 3.3.1-72 | E |
| Duct | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-2<br>(A-10) | 3.3.1-56 | A |
| Duct | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Duct | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |

| Table 3.3.2-10-IP3: Control Room Heating, Ventilation and Cooling | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Duct | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F1-3<br>(A-08) | 3.3.1-72 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (ext) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F1-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (ext) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F1-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (int) | None | None | -- | -- | I, 306 |
| Fan housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-2<br>(A-10) | 3.3.1-56 | A |
| Fan housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Fan housing | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Filter housing | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |

| **Table 3.3.2-10-IP3: Control Room Heating, Ventilation and Cooling** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Filter housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Filter housing | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Heat exchanger (fins) | Heat transfer | Aluminum | Air – outdoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |
| Heat exchanger (fins) | Heat transfer | Aluminum | Condensation (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | C |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Air – outdoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Condensation (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |

| **Table 3.3.2-10-IP3: Control Room Heating, Ventilation and Cooling** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Gas (ext) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | C |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | C |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Raw water (int) | Fouling | Service Water Integrity | VII.C1-6<br>(A-72) | 3.3.1-83 | C |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Air – outdoor (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Condensation (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Gas (ext) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | C |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | C |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-3<br>(A-65) | 3.3.1-82 | C |

**Table 3.3.2-10-IP3: Control Room Heating, Ventilation and Cooling**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Louver housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-2<br>(A-10) | 3.3.1-56 | A |
| Louver housing | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Piping | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Piping | Pressure boundary | Copper alloy | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Piping | Pressure boundary | Copper alloy | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Piping | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |
| Pump casing | Pressure boundary | Aluminum | Air – indoor (ext) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Pump casing | Pressure boundary | Aluminum | Air – indoor (int) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |

**Table 3.3.2-10-IP3: Control Room Heating, Ventilation and Cooling**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Copper alloy | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Tubing | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Valve body | Pressure boundary | Aluminum | Air – indoor (ext) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Valve body | Pressure boundary | Aluminum | Air – treated (int) | None | None | -- | -- | G |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Valve body | Pressure boundary | Copper alloy | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Valve body | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |

**Table 3.3.2-10-IP3: Control Room Heating, Ventilation and Cooling**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |

# Table 3.3.2-11-IP2
# Fire Protection – Water
# Summary of Aging Management Review

**Table 3.3.2-11-IP2: Fire Protection – Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | VII.I-1<br>(AP-28) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.G-25<br>(A-01) | 3.3.1-19 | C |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Bolting | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | -- | -- | G |
| Expansion joint | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Expansion joint | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Fire Protection | -- | -- | H |
| Expansion joint | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Fire Protection | VII.H2-2<br>(A-27) | 3.3.1-18 | E |

**Table 3.3.2-11-IP2: Fire Protection – Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flow element | Pressure boundary<br>Flow control | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Flow element | Pressure boundary<br>Flow control | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Heater housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heater housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Hydrant | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Hydrant | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Nozzle | Pressure boundary<br>Flow control | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Nozzle | Pressure boundary<br>Flow control | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Nozzle | Pressure boundary<br>Flow control | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |

| Table 3.3.2-11-IP2: Fire Protection – Water | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Nozzle | Pressure boundary<br>Flow control | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Nozzle | Pressure boundary<br>Flow control | Copper alloy > 15% Zn | Air – indoor (int) | None | None | -- | -- | G |
| Nozzle | Pressure boundary<br>Flow control | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Fire Water System | VII.G-12<br>(A-45) | 3.3.1-70 | B, 303 |
| Nozzle | Pressure boundary<br>Flow control | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.G-13<br>(A-47) | 3.3.1-84 | A, 303 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Piping | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Fire Protection | -- | -- | H |
| Piping | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Fire Protection | VII.H2-2<br>(A-27) | 3.3.1-18 | E |

| Table 3.3.2-11-IP2: Fire Protection – Water | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.G-25 (A-01) | 3.3.1-19 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24 (A-33) | 3.3.1-68 | B, 303 |
| Piping | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8 (A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Gray cast iron | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.G-25 (A-01) | 3.3.1-19 | A |
| Piping | Pressure boundary | Gray cast iron | Soil (ext) | Loss of material | Selective Leaching | VII.G-15 (A-02) | 3.3.1-85 | A |
| Piping | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Fire Water System | VII.G-24 (A-33) | 3.3.1-68 | B, 303 |
| Piping | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.G-14 (A-51) | 3.3.1-85 | A, 303 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8 (A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24 (A-33) | 3.3.1-68 | B, 303 |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |

**Table 3.3.2-11-IP2: Fire Protection – Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Pump casing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Fire Water System | VII.G-19<br>(A-55) | 3.3.1-69 | B, 303 |
| Silencer | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Silencer | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Fire Protection | -- | -- | H |
| Silencer | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Fire Protection | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Strainer | Filtration | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Strainer | Filtration | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Fire Water System | VII.G-12<br>(A-45) | 3.3.1-70 | B, 303 |
| Strainer | Filtration | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.G-13<br>(A-47) | 3.3.1-84 | A, 303 |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-11-IP2: Fire Protection – Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tank | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Aboveground Steel Tanks | VII.H1-11<br>(A-95) | 3.3.1-40 | C |
| Tank | Pressure boundary | Carbon steel | Concrete (ext) | Loss of material | Aboveground Steel Tanks | -- | -- | G |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Thermowell | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Fire Water System | VII.G-19<br>(A-55) | 3.3.1-69 | B, 303 |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Fire Water System | VII.G-12<br>(A-45) | 3.3.1-70 | B, 303 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-11-IP2: Fire Protection – Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.G-25<br>(A-01) | 3.3.1-19 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Fire Water System | VII.G-12<br>(A-45) | 3.3.1-70 | B, 303 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Fire Water System | VII.G-12<br>(A-45) | 3.3.1-70 | B, 303 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.G-13<br>(A-47) | 3.3.1-84 | A, 303 |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.G-25<br>(A-01) | 3.3.1-19 | A |
| Valve body | Pressure boundary | Gray cast iron | Soil (ext) | Loss of material | Selective Leaching | VII.G-15<br>(A-02) | 3.3.1-85 | A |

| **Table 3.3.2-11-IP2: Fire Protection – Water** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Fire Water System | VII.G-24 (A-33) | 3.3.1-68 | B, 303 |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.G-14 (A-51) | 3.3.1-85 | A, 303 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Fire Water System | VII.G-19 (A-55) | 3.3.1-69 | B, 303 |

## Table 3.3.2-11-IP3
## Fire Protection – Water
## Summary of Aging Management Review

**Table 3.3.2-11-IP3: Fire Protection – Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | VII.I-1<br>(AP-28) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.G-25<br>(A-01) | 3.3.1-19 | C |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Bolting | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | -- | -- | G |
| Expansion joint | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Expansion joint | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Fire Protection | -- | -- | H |
| Expansion joint | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Fire Protection | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Filter housing | Filtration | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |

**Table 3.3.2-11-IP3: Fire Protection – Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Filter housing | Filtration | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Flow element | Pressure boundary<br>Flow control | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Flow element | Pressure boundary<br>Flow control | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Heater housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heater housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Hydrant | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Hydrant | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |

| **Table 3.3.2-11-IP3: Fire Protection – Water** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Nozzle | Pressure boundary<br>Flow control | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Nozzle | Pressure boundary<br>Flow control | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Nozzle | Pressure boundary<br>Flow control | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Nozzle | Pressure boundary<br>Flow control | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Nozzle | Pressure boundary<br>Flow control | Copper alloy > 15% Zn | Air – indoor (int) | None | None | -- | -- | G |
| Nozzle | Pressure boundary<br>Flow control | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Fire Water System | VII.G-12<br>(A-45) | 3.3.1-70 | B, 303 |
| Nozzle | Pressure boundary<br>Flow control | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.G-13<br>(A-47) | 3.3.1-84 | A, 303 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-11-IP3: Fire Protection – Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Piping | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Fire Protection | -- | -- | H |
| Piping | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Fire Protection | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Piping | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.G-25<br>(A-01) | 3.3.1-19 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Piping | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Gray cast iron | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.G-25<br>(A-01) | 3.3.1-19 | A |
| Piping | Pressure boundary | Gray cast iron | Soil (ext) | Loss of material | Selective Leaching | VII.G-15<br>(A-02) | 3.3.1-85 | A |
| Piping | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |

**Table 3.3.2-11-IP3: Fire Protection – Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.G-14<br>(A-51) | 3.3.1-85 | A, 303 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Silencer | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Silencer | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Fire Protection | -- | -- | H |
| Silencer | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Fire Protection | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Strainer | Filtration | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

| Table 3.3.2-11-IP3: Fire Protection – Water | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tank | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Aboveground Steel Tanks | VII.H1-11<br>(A-95) | 3.3.1-40 | C |
| Tank | Pressure boundary | Carbon steel | Concrete (ext) | Loss of material | Aboveground Steel Tanks | -- | -- | G |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Fire Water System | VII.G-12<br>(A-45) | 3.3.1-70 | B, 303 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.G-25<br>(A-01) | 3.3.1-19 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |

| **Table 3.3.2-11-IP3: Fire Protection – Water** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Fire Water System | VII.G-12<br>(A-45) | 3.3.1-70 | B, 303 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Fire Water System | VII.G-12<br>(A-45) | 3.3.1-70 | B, 303 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.G-13<br>(A-47) | 3.3.1-84 | A, 303 |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.G-25<br>(A-01) | 3.3.1-19 | A |
| Valve body | Pressure boundary | Gray cast iron | Soil (ext) | Loss of material | Selective Leaching | VII.G-15<br>(A-02) | 3.3.1-85 | A |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.G-14<br>(A-51) | 3.3.1-85 | A, 303 |

# Table 3.3.2-12-IP2
# Fire Protection – CO2, Halon, and RCP Oil Collection Systems
# Summary of Aging Management Review

**Table 3.3.2-12-IP2: Fire Protection – CO2, Halon, and RCP Oil Collection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Drain pan | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Drain pan | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | One-Time Inspection | VII.G-18<br>(AP-59) | 3.3.1-33 | E |
| Flame arrestor | Flow control | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Flame arrestor | Flow control | Copper alloy | Air – indoor (int) | None | None | -- | -- | G |
| Flex hose | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flex hose | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | One-Time Inspection | VII.G-18<br>(AP-59) | 3.3.1-33 | E |

| Table 3.3.2-12-IP2: Fire Protection – CO2, Halon, and RCP Oil Collection Systems | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Nozzle | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Nozzle | Pressure boundary | Copper alloy | Air – indoor (int) | None | None | -- | -- | G |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-10<br>(A-79) | 3.3.1-89 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Fire Protection | VII.I-8<br>(A-77) | 3.3.1-58 | E |
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | Fire Protection | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Piping | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Piping | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | One-Time Inspection | VII.G-26<br>(A-83) | 3.3.1-15 | E |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Fire Protection | VII.I-8<br>(A-77) | 3.3.1-58 | E |
| Tank | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Tank | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | One-Time Inspection | VII.G-27<br>(A-82) | 3.3.1-16 | E |

**Table 3.3.2-12-IP2: Fire Protection – CO2, Halon, and RCP Oil Collection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Fire Protection | VII.I-8<br>(A-77) | 3.3.1-58 | E |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | Fire Protection | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Valve body | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | One-Time Inspection | VII.G-26<br>(A-83) | 3.3.1-15 | E |

## Table 3.3.2-12-IP3
## Fire Protection – CO2, Halon, and RCP Oil Collection Systems
## Summary of Aging Management Review

**Table 3.3.2-12-IP3: Fire Protection – CO2, Halon, and RCP Oil Collection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Drain pan | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Drain pan | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | One-Time Inspection | VII.G-18<br>(AP-59) | 3.3.1-33 | E |
| Filter | Filtration | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Filter | Filtration | Copper alloy | Air – indoor (int) | None | None | -- | -- | G |
| Filter housing | Pressure boundary | Aluminum | Air – indoor (ext) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Filter housing | Pressure boundary | Aluminum | Air – indoor (int) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |

**Table 3.3.2-12-IP3: Fire Protection – CO2, Halon, and RCP Oil Collection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flame arrestor | Flow control | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Flame arrestor | Flow control | Copper alloy | Air – indoor (int) | None | None | -- | -- | G |
| Flex hose | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flex hose | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | One-Time Inspection | VII.G-18<br>(AP-59) | 3.3.1-33 | E |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Gas (ext) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | C |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | C |
| Nozzle | Pressure boundary | Aluminum | Air – indoor (ext) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Nozzle | Pressure boundary | Aluminum | Air – indoor (int) | None | None | V.F-2<br>(EP-3) | 3.2.1-50 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-10<br>(A-79) | 3.3.1-89 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Fire Protection | VII.I-8<br>(A-77) | 3.3.1-58 | E |

**Table 3.3.2-12-IP3: Fire Protection – CO2, Halon, and RCP Oil Collection Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | Fire Protection | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Piping | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Piping | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | One-Time Inspection | VII.G-26<br>(A-83) | 3.3.1-15 | E |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Fire Protection | VII.I-8<br>(A-77) | 3.3.1-58 | E |
| Tank | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Tank | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | One-Time Inspection | VII.G-27<br>(A-82) | 3.3.1-16 | E |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Fire Protection | VII.I-8<br>(A-77) | 3.3.1-58 | E |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | Fire Protection | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Valve body | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | One-Time Inspection | VII.G-26<br>(A-83) | 3.3.1-15 | E |

# Table 3.3.2-13-IP2
# Fuel Oil Systems
# Summary of Aging Management Review

**Table 3.3.2-13-IP2: Fuel Oil Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.H1-9<br>(A-01) | 3.3.1-19 | C |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Flow element | Pressure boundary<br>Flow control | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Flow element | Pressure boundary<br>Flow control | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Heat exchanger (tubes) | Heat transfer | Carbon steel | Air – indoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |

| **Table 3.3.2-13-IP2: Fuel Oil Systems** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (tubes) | Heat transfer | Carbon steel | Fuel oil (int) | Fouling | Diesel Fuel Monitoring | -- | -- | G |
| Heat exchanger (tubes) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-10<br>(AP-41) | 3.3.1-59 | C |
| Heat exchanger (tubes) | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Heater housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heater housing | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Orifice | Pressure boundary<br>Flow control | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Orifice | Pressure boundary<br>Flow control | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.H1-8<br>(A-24) | 3.3.1-60 | A |

| Table 3.3.2-13-IP2: Fuel Oil Systems | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Concrete (ext) | None | None | VII.J-21<br>(AP-3) | 3.3.1-96 | A |
| Piping | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Piping | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Fire Protection<br>Diesel Fuel Monitoring | VII.G-21<br>(A-28) | 3.3.1-64 | A |
| Piping | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.H1-9<br>(A-01) | 3.3.1-19 | A |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Pump casing | Pressure boundary | Copper alloy | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-3<br>(AP-44) | 3.3.1-32 | B, 316 |
| Strainer | Filtration | Carbon steel | Fuel oil (ext) | Loss of material | Diesel Fuel Monitoring | VII.HI-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Strainer | Filtration | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Strainer | Filtration | Stainless steel | Fuel oil (ext) | Loss of material | Diesel Fuel Monitoring | VII.H1-6<br>(AP-54) | 3.3.1-32 | B, 316 |

**Table 3.3.2-13-IP2: Fuel Oil Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Strainer | Filtration | Stainless steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-6<br>(AP-54) | 3.3.1-32 | B, 316 |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Aboveground Steel Tanks | VII.H1-11<br>(A-95) | 3.3.1-40 | A |
| Tank | Pressure boundary | Carbon steel | Concrete (ext) | Loss of material | Aboveground Steel Tanks | -- | -- | G |
| Tank | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Tank | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VIII.E-1<br>(S-01) | 3.4.1-11 | C |
| Tank | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 317 |
| Tank | Pressure boundary | Stainless steel | Fuel oil (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H1-6<br>(AP-54) | 3.3.1-32 | E, 317 |

**Table 3.3.2-13-IP2: Fuel Oil Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3 (EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-3 (AP-44) | 3.3.1-32 | B, 316 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-6 (AP-54) | 3.3.1-32 | B, 316 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8 (A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.H1-8 (A-24) | 3.3.1-60 | A |
| Valve body | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10 (A-30) | 3.3.1-20 | B, 316 |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3 (EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-3 (AP-44) | 3.3.1-32 | B, 316 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3 (EP-10) | 3.2.1-53 | C |

| Table 3.3.2-13-IP2: Fuel Oil Systems | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-3 (AP-44) | 3.3.1-32 | B, 316 |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8 (A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10 (A-30) | 3.3.1-20 | B, 316 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G, 317 |
| Valve body | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 317 |
| Valve body | Pressure boundary | Stainless steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-6 (AP-54) | 3.3.1-32 | B, 316 |
| Valve body | Pressure boundary | Stainless steel | Fuel oil (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H1-6 (AP-54) | 3.3.1-32 | E, 317 |

# Table 3.3.2-13-IP3
# Fuel Oil Systems
# Summary of Aging Management Review

| Table 3.3.2-13-IP3: Fuel Oil Systems | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.H1-9<br>(A-01) | 3.3.1-19 | C |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Flame arrestor | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Flame arrestor | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Level gauge | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |

**Table 3.3.2-13-IP3: Fuel Oil Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Level gauge | Pressure boundary | Glass | Fuel oil (int) | None | None | VII.J-9<br>(AP-49) | 3.3.1-93 | A |
| Level gauge | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Level gauge | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Level gauge | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Level gauge | Pressure boundary | Stainless steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-6<br>(AP-54) | 3.3.1-32 | B, 316 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.H1-8<br>(A-24) | 3.3.1-60 | A |
| Piping | Pressure boundary | Carbon steel | Concrete (ext) | None | None | VII.J-21<br>(AP-3) | 3.3.1-96 | A |
| Piping | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Piping | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Fire Protection<br>Diesel Fuel Monitoring | VII.G-21<br>(A-28) | 3.3.1-64 | A |

**Table 3.3.2-13-IP3: Fuel Oil Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.H1-9<br>(A-01) | 3.3.1-19 | A |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Strainer | Filtration | Stainless steel | Fuel oil (ext) | Loss of material | Diesel Fuel Monitoring | VII.H1-6<br>(AP-54) | 3.3.1-32 | B, 316 |
| Strainer | Filtration | Stainless steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-6<br>(AP-54) | 3.3.1-32 | B, 316 |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Tank | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VIII.E-1<br>(S-01) | 3.4.1-11 | C |

**Table 3.3.2-13-IP3: Fuel Oil Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-3<br>(AP-44) | 3.3.1-32 | B, 316 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-6<br>(AP-54) | 3.3.1-32 | B, 316 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.H1-8<br>(A-24) | 3.3.1-60 | A |
| Valve body | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-3<br>(AP-44) | 3.3.1-32 | B, 316 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |

**Table 3.3.2-13-IP3: Fuel Oil Systems**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-3 (AP-44) | 3.3.1-32 | B, 316 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-6 (AP-54) | 3.3.1-32 | B, 316 |

# Table 3.3.2-14-IP2
# Emergency Diesel Generators
# Summary of Aging Management Review

**Table 3.3.2-14-IP2: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Blower housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Blower housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | VII.I-1<br>(AP-28) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Duct | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Duct | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (ext) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F1-7<br>(A-17) | 3.3.1-11 | E |

| Table 3.3.2-14-IP2: Emergency Diesel Generators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (ext) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F1-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (int) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F1-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (int) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F1-7<br>(A-17) | 3.3.1-11 | E |
| Expansion joint | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Expansion joint | Pressure boundary | Stainless steel | Exhaust gas (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Expansion joint | Pressure boundary | Stainless steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Filter housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |

**Table 3.3.2-14-IP2: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.H2-3 (AP-41) | 3.3.1-59 | A |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-5 (A-64) | 3.3.1-77 | C |
| Heat exchanger (fins) | Heat transfer | Aluminum | Air – indoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Heat exchanger (housing) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.H2-3 (AP-41) | 3.3.1-59 | A |
| Heat exchanger (housing) | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1 (E-25) | 3.2.1-32 | E |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.H2-3 (AP-41) | 3.3.1-59 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-5 (AP-39) | 3.3.1-21 | B, 316 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1 (A-63) | 3.3.1-48 | D |

**Table 3.3.2-14-IP2: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn | Air – indoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn | Treated water (int) | Fouling | Water Chemistry Control – Closed Cooling Water | VII.C2-2<br>(AP-80) | 3.3.1-52 | D |
| Heat exchanger (tubes) | Heat transfer | Titanium | Lube oil (ext) | Fouling | Oil Analysis | -- | -- | F, 316 |
| Heat exchanger (tubes) | Heat transfer | Titanium | Raw water (int) | Fouling | Service Water Integrity | -- | -- | F |
| Heat exchanger (tubes) | Heat transfer | Titanium | Treated water (ext) | Fouling | Water Chemistry Control – Closed Cooling Water | -- | -- | F |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | Loss of material – wear | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.H2-12<br>(AP-43) | 3.3.1-84 | A, 307 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | D |

**Table 3.3.2-14-IP2: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (tubes) | Pressure boundary | Titanium | Lube oil (ext) | Loss of material | Oil Analysis | -- | -- | F |
| Heat exchanger (tubes) | Pressure boundary | Titanium | Lube oil (ext) | Loss of material – wear | Service Water Integrity | -- | -- | F |
| Heat exchanger (tubes) | Pressure boundary | Titanium | Raw water (int) | Loss of material | Service Water Integrity | -- | -- | F |
| Heat exchanger (tubes) | Pressure boundary | Titanium | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | -- | -- | F |
| Heat exchanger (tubes) | Pressure boundary | Titanium | Treated water (ext) | Loss of material – wear | Service Water Integrity | -- | -- | F |
| Heater housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heater housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Heater housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |

| **Table 3.3.2-14-IP2: Emergency Diesel Generators** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Lubricator housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Lubricator housing | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Orifice | Pressure boundary<br>Flow control | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Orifice | Pressure boundary<br>Flow control | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Piping | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Piping | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |

**Table 3.3.2-14-IP2: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Piping | Pressure boundary | Stainless steel | Lube oil (int) | Cracking | Oil Analysis | -- | -- | H |
| Piping | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-17<br>(AP-59) | 3.3.1-33 | B, 316 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Closed Cooling Water | VII.C2-11<br>(AP-60) | 3.3.1-46 | D |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | D |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-14-IP2: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Pump casing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-11<br>(AP-50) | 3.3.1-93 | A, 303 |
| Silencer | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Silencer | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Silencer | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Strainer | Filtration | Stainless steel | Condensation (ext) | Loss of material | One-Time Inspection | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Strainer | Filtration | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Strainer | Filtration | Stainless steel | Lube oil (ext) | Cracking | Oil Analysis | -- | -- | H |
| Strainer | Filtration | Stainless steel | Lube oil (ext) | Loss of material | Oil Analysis | VII.H2-17<br>(AP-59) | 3.3.1-33 | B, 316 |

**Table 3.3.2-14-IP2: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Strainer | Filtration | Stainless steel | Lube oil (int) | Cracking | Oil Analysis | -- | -- | H |
| Strainer | Filtration | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-17<br>(AP-59) | 3.3.1-33 | B, 316 |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Strainer housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Strainer housing | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

**Table 3.3.2-14-IP2: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tank | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | V.A-26<br>(EP-53) | 3.2.1-8 | E |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Thermowell | Pressure boundary | Stainless steel | Lube oil (int) | Cracking | Oil Analysis | -- | -- | H |
| Thermowell | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-17<br>(AP-59) | 3.3.1-33 | B, 316 |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Closed Cooling Water | VII.C2-11<br>(AP-60) | 3.3.1-46 | D |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | D |
| Trap | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Trap | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |

| Table 3.3.2-14-IP2:  Emergency Diesel Generators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Copper alloy | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.G-9<br>(AP-78) | 3.3.1-28 | E |
| Tubing | Pressure boundary | Copper alloy | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-10<br>(AP-47) | 3.3.1-26 | B, 316 |
| Tubing | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-8<br>(AP-12) | 3.3.1-51 | B |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Tubing | Pressure boundary | Stainless steel | Lube oil (int) | Cracking | Oil Analysis | -- | -- | H |
| Tubing | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-17<br>(AP-59) | 3.3.1-33 | B, 316 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Closed Cooling Water | VII.C2-11<br>(AP-60) | 3.3.1-46 | D |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | D |

**Table 3.3.2-14-IP2: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.G-9<br>(AP-78) | 3.3.1-28 | E |
| Valve body | Pressure boundary | Copper alloy | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-10<br>(AP-47) | 3.3.1-26 | B, 316 |
| Valve body | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-8<br>(AP-12) | 3.3.1-51 | B |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.G-9<br>(AP-78) | 3.3.1-28 | E |

**Table 3.3.2-14-IP2: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-10 (AP-47) | 3.3.1-26 | B, 316 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (ext) | Loss of material | Selective Leaching | VII.H2-12 (AP-43) | 3.3.1-84 | A, 307 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-8 (AP-12) | 3.3.1-51 | B |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.H2-13 (A-47) | 3.3.1-84 | A, 303 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.H2-12 (AP-43) | 3.3.1-84 | A, 307 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-8 (AP-12) | 3.3.1-51 | B |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | VII.F1-1 (A-09) | 3.3.1-27 | E |

**Table 3.3.2-14-IP2: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Exhaust gas (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Valve body | Pressure boundary | Stainless steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Valve body | Pressure boundary | Stainless steel | Lube oil (int) | Cracking | Oil Analysis | -- | -- | H |
| Valve body | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-17<br>(AP-59) | 3.3.1-33 | B, 316 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Closed Cooling Water | VII.C2-11<br>(AP-60) | 3.3.1-46 | D |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | D |

# Table 3.3.2-14-IP3
# Emergency Diesel Generators
# Summary of Aging Management Review

| Table 3.3.2-14-IP3: Emergency Diesel Generators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Blower housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Blower housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | VII.I-1<br>(AP-28) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Dryer | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Dryer | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Duct | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

**Table 3.3.2-14-IP3: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Duct | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (ext) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F1-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (ext) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F1-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (int) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F1-7<br>(A-17) | 3.3.1-11 | E |
| Duct flexible connection | Pressure boundary | Elastomer | Air – indoor (int) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F1-7<br>(A-17) | 3.3.1-11 | E |
| Expansion joint | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Expansion joint | Pressure boundary | Stainless steel | Exhaust gas (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Expansion joint | Pressure boundary | Stainless steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-14-IP3: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Filter housing | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Filter housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.H2-3<br>(AP-41) | 3.3.1-59 | A |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-5<br>(A-64) | 3.3.1-77 | C |
| Heat exchanger (fins) | Heat transfer | Aluminum | Air – indoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Heat exchanger (housing) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.H2-3<br>(AP-41) | 3.3.1-59 | A |
| Heat exchanger (housing) | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |

**Table 3.3.2-14-IP3: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.H2-3<br>(AP-41) | 3.3.1-59 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-5<br>(AP-39) | 3.3.1-21 | B, 316 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | D |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn | Air – indoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn | Lube oil (ext) | Fouling | Oil Analysis | V.A-12<br>(EP-47) | 3.2.1-9 | B, 316 |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn | Raw water (int) | Fouling | Service Water Integrity | VII.C1-6<br>(A-72) | 3.3.1-83 | C |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn | Treated water (ext) | Fouling | Water Chemistry Control – Closed Cooling Water | VII.C2-2<br>(AP-80) | 3.3.1-52 | D |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn | Treated water (int) | Fouling | Water Chemistry Control – Closed Cooling Water | VII.C2-2<br>(AP-80) | 3.3.1-52 | D |

**Table 3.3.2-14-IP3: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | Loss of material – wear | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Lube oil (ext) | Loss of material | Oil Analysis | VII.H2-10 (AP-47) | 3.3.1-26 | D, 316 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Lube oil (ext) | Loss of material – wear | Service Water Integrity | -- | -- | H |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Raw water (int) | Loss of material | Selective Leaching | VII.H2-12 (AP-43) | 3.3.1-84 | A, 307 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Raw water (int) | Loss of material | Service Water Integrity | VII.H2-11 (AP-45) | 3.3.1-80 | C |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Treated water (ext) | Loss of material | Selective Leaching | VII.H2-12 (AP-43) | 3.3.1-84 | A, 307 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2 (AP-34) | 3.3.1-51 | D |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Treated water (ext) | Loss of material – wear | Service Water Integrity | -- | -- | H |

**Table 3.3.2-14-IP3: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.H2-12<br>(AP-43) | 3.3.1-84 | A, 307 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | D |
| Heater housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heater housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Heater housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Lubricator housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Lubricator housing | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Orifice | Pressure boundary<br>Flow control | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-14-IP3: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Orifice | Pressure boundary<br>Flow control | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Piping | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Piping | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Piping | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

| Table 3.3.2-14-IP3: Emergency Diesel Generators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Piping | Pressure boundary | Stainless steel | Lube oil (int) | Cracking | Oil Analysis | -- | -- | H |
| Piping | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-17<br>(AP-59) | 3.3.1-33 | B, 316 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Closed Cooling Water | VII.C2-11<br>(AP-60) | 3.3.1-46 | D |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | D |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-11<br>(AP-50) | 3.3.1-93 | A, 303 |
| Silencer | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-14-IP3: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Silencer | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Silencer | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Silencer | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Silencer | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Strainer | Filtration | Stainless steel | Condensation (ext) | Loss of material | One-Time Inspection | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Strainer | Filtration | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Strainer | Filtration | Stainless steel | Lube oil (ext) | Cracking | Oil Analysis | -- | -- | H |
| Strainer | Filtration | Stainless steel | Lube oil (ext) | Loss of material | Oil Analysis | VII.H2-17<br>(AP-59) | 3.3.1-33 | B, 316 |
| Strainer | Filtration | Stainless steel | Lube oil (int) | Cracking | Oil Analysis | -- | -- | H |
| Strainer | Filtration | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-17<br>(AP-59) | 3.3.1-33 | B, 316 |

| Table 3.3.2-14-IP3: Emergency Diesel Generators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Strainer housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tank | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | V.A-26<br>(EP-53) | 3.2.1-8 | E |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

| Table 3.3.2-14-IP3: Emergency Diesel Generators | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Thermowell | Pressure boundary | Stainless steel | Lube oil (int) | Cracking | Oil Analysis | -- | -- | H |
| Thermowell | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-17<br>(AP-59) | 3.3.1-33 | B, 316 |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Closed Cooling Water | VII.C2-11<br>(AP-60) | 3.3.1-46 | D |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | D |
| Trap | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Trap | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.G-9<br>(AP-78) | 3.3.1-28 | E |
| Tubing | Pressure boundary | Copper alloy | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-10<br>(AP-47) | 3.3.1-26 | B, 316 |

**Table 3.3.2-14-IP3: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-8<br>(AP-12) | 3.3.1-51 | B |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Tubing | Pressure boundary | Stainless steel | Lube oil (int) | Cracking | Oil Analysis | -- | -- | H |
| Tubing | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-17<br>(AP-59) | 3.3.1-33 | B, 316 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Closed Cooling Water | VII.C2-11<br>(AP-60) | 3.3.1-46 | D |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | D |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |

**Table 3.3.2-14-IP3: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Valve body | Pressure boundary | Carbon steel | Treated water (ext) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.G-9<br>(AP-78) | 3.3.1-28 | E |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-10<br>(AP-47) | 3.3.1-26 | B, 316 |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |

**Table 3.3.2-14-IP3: Emergency Diesel Generators**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Valve body | Pressure boundary | Stainless steel | Lube oil (int) | Cracking | Oil Analysis | -- | -- | H |
| Valve body | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-17<br>(AP-59) | 3.3.1-33 | B, 316 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Closed Cooling Water | VII.C2-11<br>(AP-60) | 3.3.1-46 | D |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | D |

# Table 3.3.2-15-IP2
# Security Generator
# Summary of Aging Management Review

**Table 3.3.2-15-IP2: Security Generator**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Flexible bellows | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flexible bellows | Pressure boundary | Stainless steel | Exhaust gas (int) | Cracking – fatigue | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Flexible bellows | Pressure boundary | Stainless steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Heat exchanger (bonnet) | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |

| Table 3.3.2-15-IP2: Security Generator | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (bonnet) | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | D |
| Heat exchanger (fins) | Heat transfer | Aluminum | Air – indoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn | Air – indoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn | Treated water (int) | Fouling | Water Chemistry Control – Closed Cooling Water | VII.C2-2<br>(AP-80) | 3.3.1-52 | D |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.H2-12<br>(AP-43) | 3.3.1-84 | A, 304 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | D |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

| Table 3.3.2-15-IP2: Security Generator | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Piping | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Piping | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | D |
| Silencer | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Silencer | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Silencer | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Turbocharger | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Turbocharger | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |

**Table 3.3.2-15-IP2: Security Generator**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Turbocharger | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Turbocharger | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Valve body | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |

# Table 3.3.2-15-IP3
# Security Generator
# Summary of Aging Management Review

**Table 3.3.2-15-IP3: Security Generator**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Flexible bellows | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Flexible bellows | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Flexible bellows | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Flexible connection | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

**Table 3.3.2-15-IP3: Security Generator**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flexible connection | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |
| Heat exchanger (bonnet) | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Heat exchanger (bonnet) | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | D |
| Heat exchanger (fins) | Heat transfer | Aluminum | Air – indoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn | Air – indoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn | Treated water (int) | Fouling | Water Chemistry Control – Closed Cooling Water | VII.C2-2<br>(AP-80) | 3.3.1-52 | D |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.H2-12<br>(AP-43) | 3.3.1-84 | A, 304 |

**Table 3.3.2-15-IP3: Security Generator**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | D |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Piping | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Piping | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Piping | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Piping | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.C1-18<br>(A-01) | 3.3.1-19 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | D |
| Silencer | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-15-IP3: Security Generator**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Silencer | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Silencer | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Tank | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VIII.E-1<br>(S-01) | 3.4.1-11 | C |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Valve body | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |

# Table 3.3.2-16-IP2
# SBO/Appendix R Diesel Generator System
# Summary of Aging Management Review

**Table 3.3.2-16-IP2: SBO/Appendix R Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Filter housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Flexible connection | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flexible connection | Pressure boundary | Stainless steel | Exhaust gas (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Flexible connection | Pressure boundary | Stainless steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |

**Table 3.3.2-16-IP2: SBO/Appendix R Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.H2-3<br>(AP-41) | 3.3.1-59 | A |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | D |
| Heat exchanger (fins) | Heat transfer | Aluminum | Air – indoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.H2-3<br>(AP-41) | 3.3.1-59 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-5<br>(AP-39) | 3.3.1-21 | B, 316 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | D |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Air – indoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |

| **Table 3.3.2-16-IP2: SBO/Appendix R Diesel Generator System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Lube oil (ext) | Fouling | Oil Analysis | V.A-12<br>(EP-47) | 3.2.1-9 | D, 316 |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Treated water (int) | Fouling | Water Chemistry Control – Closed Cooling Water | VII.C2-2<br>(AP-80) | 3.3.1-52 | D |
| Heat exchanger (tubes) | Heat transfer | Stainless steel | Treated water (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Heat exchanger (tubes) | Heat transfer | Stainless steel | Treated water > 140°F (int) | Fouling | Water Chemistry Control – Closed Cooling Water | VII.C2-3<br>(AP-63) | 3.3.1-52 | D |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Lube oil (ext) | Loss of material | Oil Analysis | VII.H2-10<br>(AP-47) | 3.3.1-26 | D, 316 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | D |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |

**Table 3.3.2-16-IP2: SBO/Appendix R Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Closed Cooling Water | VII.E3-2<br>(A-68) | 3.3.1-46 | D |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E3-1<br>(A-67) | 3.3.1-49 | D |
| Heat exchanger (tubes) | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material – wear | Heat Exchanger Monitoring | -- | -- | H |
| Heater housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heater housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Piping | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |

| Table 3.3.2-16-IP2: SBO/Appendix R Diesel Generator System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Piping | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Sight glass | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Sight glass | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.H2-12<br>(AP-43) | 3.3.1-84 | A, 307 |
| Sight glass | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-8<br>(AP-12) | 3.3.1-51 | B |

**Table 3.3.2-16-IP2: SBO/Appendix R Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-11<br>(AP-50) | 3.3.1-93 | A, 303 |
| Silencer | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Silencer | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Silencer | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Turbocharger | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Turbocharger | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |

| Table 3.3.2-16-IP2: SBO/Appendix R Diesel Generator System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Turbocharger housing | Heat transfer | Carbon steel | Air – indoor (int) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |
| Turbocharger housing | Heat transfer | Carbon steel | Treated water (int) | Fouling | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Turbocharger housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Turbocharger housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Turbocharger housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |

## Table 3.3.2-16-IP3
## Appendix R Diesel Generator System
## Summary of Aging Management Review

**Table 3.3.2-16-IP3: Appendix R Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Blower housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Blower housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | VII.I-1<br>(AP-28) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Compressor housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Compressor housing | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Expansion joint | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-16-IP3: Appendix R Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Expansion joint | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Expansion joint | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Filter housing | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.H2-3<br>(AP-41) | 3.3.1-59 | A |
| Heat exchanger (bonnet) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | D |
| Heat exchanger (fins) | Heat transfer | Copper alloy | Air – indoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |

**Table 3.3.2-16-IP3: Appendix R Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (fins) | Heat transfer | Aluminum | Air – outdoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |
| Heat exchanger (housing) | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.H2-4<br>(AP-40) | 3.3.1-59 | A |
| Heat exchanger (housing) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | D |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.H2-3<br>(AP-41) | 3.3.1-59 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-5<br>(AP-39) | 3.3.1-21 | B, 316 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | D |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn | Air – indoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |

| **Table 3.3.2-16-IP3: Appendix R Diesel Generator System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn | Treated water (int) | Fouling | Water Chemistry Control – Closed Cooling Water | VII.C2-2<br>(AP-80) | 3.3.1-52 | D |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn (inhibited) | Air – outdoor (ext) | Fouling | Periodic Surveillance and Preventive Maintenance | -- | -- | G |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn (inhibited) | Lube oil (ext) | Fouling | Oil Analysis | V.A-12<br>(EP-47) | 3.2.1-9 | D, 316 |
| Heat exchanger (tubes) | Heat transfer | Copper alloy > 15% Zn (inhibited) | Treated water (int) | Fouling | Water Chemistry Control – Closed Cooling Water | VII.C2-2<br>(AP-80) | 3.3.1-52 | D |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.H2-12<br>(AP-43) | 3.3.1-84 | A, 304 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | D |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |

| Table 3.3.2-16-IP3: Appendix R Diesel Generator System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Lube oil (ext) | Loss of material | Oil Analysis | VII.H2-10<br>(AP-47) | 3.3.1-26 | D, 316 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy > 15% Zn (inhibited) | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.E1-2<br>(AP-34) | 3.3.1-51 | D |
| Heater housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heater housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Heater housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Lubricator housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Lubricator housing | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Motor housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Motor housing | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |

**Table 3.3.2-16-IP3: Appendix R Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | V.A-19<br>(E-29) | 3.2.1-32 | E |
| Piping | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Piping | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Piping | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |
| Piping | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |

**Table 3.3.2-16-IP3: Appendix R Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Sight glass | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-11<br>(AP-50) | 3.3.1-93 | A, 303 |
| Silencer | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Silencer | Pressure boundary | Carbon steel | Exhaust gas (int) | Cracking – fatigue | Periodic Surveillance and Preventive Maintenance | -- | -- | H |
| Silencer | Pressure boundary | Carbon steel | Exhaust gas (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-2<br>(A-27) | 3.3.1-18 | E |

**Table 3.3.2-16-IP3: Appendix R Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Strainer | Filtration | Stainless steel | Condensation (ext) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Strainer | Filtration | Stainless steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Strainer | Filtration | Stainless steel | Lube oil (ext) | Loss of material | Oil Analysis | VII.H2-17<br>(AP-59) | 3.3.1-33 | B, 316 |
| Strainer | Filtration | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-17<br>(AP-59) | 3.3.1-33 | B, 316 |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Strainer housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |

**Table 3.3.2-16-IP3: Appendix R Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Thermowell | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Thermowell | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-8<br>(AP-12) | 3.3.1-51 | B |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Thermowell | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-17<br>(AP-59) | 3.3.1-33 | B, 316 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |

| Table 3.3.2-16-IP3: Appendix R Diesel Generator System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-20<br>(AP-30) | 3.3.1-14 | B, 316 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-23<br>(A-25) | 3.3.1-47 | B |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.G-9<br>(AP-78) | 3.3.1-28 | E |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-10<br>(AP-47) | 3.3.1-26 | B, 316 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.H2-12<br>(AP-43) | 3.3.1-84 | A, 307 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.H2-8<br>(AP-12) | 3.3.1-51 | B |
| Valve body | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |

**Table 3.3.2-16-IP3: Appendix R Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Valve body | Pressure boundary | Stainless steel | Lube oil (int) | Cracking | Oil Analysis | -- | -- | H |
| Valve body | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-17<br>(AP-59) | 3.3.1-33 | B, 316 |

## Table 3.3.2-17-IP2
## City Water
## Summary of Aging Management Review

**Table 3.3.2-17-IP2: City Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | VII.I-1<br>(AP-28) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.C1-18<br>(A-01) | 3.3.1-19 | C |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.C1-18<br>(A-01) | 3.3.1-19 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |

**Table 3.3.2-17-IP2: City Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Gray cast iron | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Piping | Pressure boundary | Gray cast iron | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.C1-18<br>(A-01) | 3.3.1-19 | C |
| Piping | Pressure boundary | Gray cast iron | Soil (ext) | Loss of material | Selective Leaching | VII.C1-12<br>(A-02) | 3.3.1-85 | C |
| Piping | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.G-14<br>(A-51) | 3.3.1-85 | C, 303 |
| Piping | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Tank | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Aboveground Steel Tanks | VII.H1-11<br>(A-95) | 3.3.1-40 | C |
| Tank | Pressure boundary | Carbon steel | Concrete (ext) | Loss of material | Aboveground Steel Tanks | -- | -- | G |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |

**Table 3.3.2-17-IP2: City Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.C1-18<br>(A-01) | 3.3.1-19 | C |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.G-13<br>(A-47) | 3.3.1-84 | C, 303 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-17-IP2: City Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Gray cast iron | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.C1-18<br>(A-01) | 3.3.1-19 | C |
| Valve body | Pressure boundary | Gray cast iron | Soil (ext) | Loss of material | Selective Leaching | VII.C1-12<br>(A-02) | 3.3.1-85 | C |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.G-14<br>(A-51) | 3.3.1-85 | C, 303 |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |

# Table 3.3.2-17-IP3
# City Water
# Summary of Aging Management Review

**Table 3.3.2-17-IP3: City Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | VII.I-1<br>(AP-28) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.C1-18<br>(A-01) | 3.3.1-19 | C |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.C1-18<br>(A-01) | 3.3.1-19 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |

**Table 3.3.2-17-IP3: City Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Gray cast iron | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Piping | Pressure boundary | Gray cast iron | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.C1-18<br>(A-01) | 3.3.1-19 | C |
| Piping | Pressure boundary | Gray cast iron | Soil (ext) | Loss of material | Selective Leaching | VII.C1-12<br>(A-02) | 3.3.1-85 | C |
| Piping | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.G-14<br>(A-51) | 3.3.1-85 | C, 303 |
| Piping | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-17-IP3: City Water**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.G-13<br>(A-47) | 3.3.1-84 | C, 303 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |

# Table 3.3.2-18-IP2
# Plant Drains
# Summary of Aging Management Review

**Table 3.3.2-18-IP2: Plant Drains**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | VII.I-1<br>(AP-28) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Bolting | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | -- | -- | G |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Concrete (ext) | None | None | VII.J-21<br>(AP-3) | 3.3.1-96 | A |

| **Table 3.3.2-18-IP2: Plant Drains** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Piping | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.C1-18<br>(A-01) | 3.3.1-19 | C |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |
| Piping | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Piping | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |
| Strainer | Filtration | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer | Filtration | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

**Table 3.3.2-18-IP2: Plant Drains**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |

# Table 3.3.2-18-IP3
# Plant Drains
# Summary of Aging Management Review

**Table 3.3.2-18-IP3: Plant Drains**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | VII.I-1<br>(AP-28) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Bolting | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | -- | -- | G |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-9<br>(A-78) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Concrete (ext) | None | None | VII.J-21<br>(AP-3) | 3.3.1-96 | A |

**Table 3.3.2-18-IP3: Plant Drains**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Piping | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VII.C1-18<br>(A-01) | 3.3.1-19 | C |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |
| Piping | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Piping | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |
| Strainer | Filtration | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer | Filtration | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

**Table 3.3.2-18-IP3: Plant Drains**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |

# Table 3.3.2-19-1-IP2
# Auxiliary Steam System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-1-IP2: Auxiliary Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Filter housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Flex joint | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flex joint | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Flex joint | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | G |

| Table 3.3.2-19-1-IP2: Auxiliary Steam System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Flex joint | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Flex joint | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Flex joint | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Flex joint | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-37<br>(S-19) | 3.4.1-3 | C, 314 |
| Heater housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

| Table 3.3.2-19-1-IP2: Auxiliary Steam System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heater housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Heater housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Heater housing | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Heater housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |

**Table 3.3.2-19-1-IP2: Auxiliary Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | C, 311 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |

**Table 3.3.2-19-1-IP2: Auxiliary Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Steam trap | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |

| **Table 3.3.2-19-1-IP2: Auxiliary Steam System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Thermowell | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Thermowell | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |

**Table 3.3.2-19-1-IP2: Auxiliary Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |

**Table 3.3.2-19-1-IP2: Auxiliary Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | C, 311 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | CASS | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Valve body | Pressure boundary | CASS | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | F |
| Valve body | Pressure boundary | CASS | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |

| Table 3.3.2-19-1-IP2: Auxiliary Steam System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | CASS | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Valve body | Pressure boundary | CASS | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | CASS | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | -- | -- | G |
| Valve body | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-5<br>(SP-61) | 3.4.1-15 | C, 314 |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Valve body | Pressure boundary | Gray cast iron | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |

**Table 3.3.2-19-1-IP2: Auxiliary Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Gray cast iron | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.C2-9<br>(AP-31) | 3.3.1-85 | C |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |

| Table 3.3.2-19-1-IP2: Auxiliary Steam System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |

# Table 3.3.2-19-2-IP2
# Conventional Closed Cooling System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-2-IP2: Conventional Closed Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Flex joint | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flex joint | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | B |
| Orifice | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-19-2-IP2: Conventional Closed Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Orifice | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Sight Glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Sight Glass | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |

| Table 3.3.2-19-2-IP2: Conventional Closed Cooling System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Sight Glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight Glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-11<br>(AP-50) | 3.3.1-93 | A |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |

| Table 3.3.2-19-2-IP2: Conventional Closed Cooling System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-4<br>(AP-12) | 3.3.1-51 | B |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.C2-6<br>(AP-43) | 3.3.1-84 | A |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-4<br>(AP-12) | 3.3.1-51 | B |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.C2-8<br>(A-50) | 3.3.1-85 | A |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |

# Table 3.3.2-19-3-IP2
# Chemical Feed System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-3-IP2: Chemical Feed System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Flex joint | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flex joint | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |

| Table 3.3.2-19-3-IP2: Chemical Feed System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-13<br>(AP-51) | 3.3.1-93 | A |
| Strainer housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Strainer housing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tank | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |

**Table 3.3.2-19-3-IP2: Chemical Feed System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |

# Table 3.3.2-19-4-IP2
# Condensate System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-4-IP2: Condensate System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Blower housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Blower housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Ejector | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Ejector | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Expansion joint | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |

**Table 3.3.2-19-4-IP2: Condensate System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Expansion joint | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Expansion joint | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Expansion joint | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Flow element | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Flow element | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |

**Table 3.3.2-19-4-IP2: Condensate System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |

| **Table 3.3.2-19-4-IP2: Condensate System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Sight glass | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VIII.I-5<br>(SP-9) | 3.4.1-40 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VIII.I-8<br>(SP-35) | 3.4.1-40 | A |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Strainer housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Strainer housing | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |

| **Table 3.3.2-19-4-IP2: Condensate System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Strainer housing | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Strainer housing | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Tank | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tank | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Tank | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Thermowell | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |

**Table 3.3.2-19-4-IP2: Condensate System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Thermowell | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Thermowell | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Thermowell | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |

**Table 3.3.2-19-4-IP2: Condensate System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | VIII.I-2<br>(SP-6) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-5<br>(SP-61) | 3.4.1-15 | C, 314 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | VIII.I-2<br>(SP-6) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VIII.E-21<br>(SP-55) | 3.4.1-35 | A |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-5<br>(SP-61) | 3.4.1-15 | C, 314 |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Gray cast iron | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Gray cast iron | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Valve body | Pressure boundary | Gray cast iron | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |

**Table 3.3.2-19-4-IP2: Condensate System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |

# Table 3.3.2-19-5-IP2
# Chemical and Volume Control System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-5-IP2: Chemical and Volume Control System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | C |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |

**Table 3.3.2-19-5-IP2: Chemical and Volume Control System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Pump casing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17 (AP-79) | 3.3.1-91 | A |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Tank | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27 (EP-41) | 3.2.1-49 | C |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Thermowell | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17 (AP-79) | 3.3.1-91 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17 (AP-79) | 3.3.1-91 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17 (AP-79) | 3.3.1-91 | A |

# Table 3.3.2-19-6-IP2
# Circulating Water System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-6-IP2: Circulating Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Expansion joint | Pressure boundary | Elastomer | Air – indoor (ext) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.F1-7<br>(A-17) | 3.3.1-11 | E |
| Expansion joint | Pressure boundary | Elastomer | Air – indoor (ext) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.F1-7<br>(A-17) | 3.3.1-11 | E |
| Expansion joint | Pressure boundary | Elastomer | Raw water (int) | Change in material properties | Periodic Surveillance and Preventive Maintenance | VII.C1-1<br>(AP-75) | 3.3.1-75 | E |
| Expansion joint | Pressure boundary | Elastomer | Raw water (int) | Cracking | Periodic Surveillance and Preventive Maintenance | VII.C1-1<br>(AP-75) | 3.3.1-75 | E |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |

| Table 3.3.2-19-6-IP2: Circulating Water System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VIII.G-36<br>(S-12) | 3.4.1-8 | E |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Pump casing | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VIII.G-36<br>(S-12) | 3.4.1-8 | E |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Sight glass | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VIII.G-36<br>(S-12) | 3.4.1-8 | E |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VIII.I-5<br>(SP-9) | 3.4.1-40 | A |
| Sight glass | Pressure boundary | Glass | Raw water (int) | None | None | VIII.I-7<br>(SP-34) | 3.4.1-40 | A |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Thermowell | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VIII.G-36<br>(S-12) | 3.4.1-8 | E |

**Table 3.3.2-19-6-IP2: Circulating Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VIII.E-27<br>(SP-36) | 3.4.1-32 | E |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VIII.G-36<br>(S-12) | 3.4.1-8 | E |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | VIII.I-2<br>(SP-6) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Copper alloy | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VIII.A-4<br>(SP-31) | 3.4.1-32 | E |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VIII.E-27<br>(SP-36) | 3.4.1-32 | E |

# Table 3.3.2-19-7-IP2
# City Water System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-7-IP2: City Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-19-7-IP2: City Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Piping | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Piping | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |

**Table 3.3.2-19-7-IP2: City Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 305 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | CASS | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 305 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.G-13<br>(A-47) | 3.3.1-84 | C, 303 |

| Table 3.3.2-19-7-IP2: City Water System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.G-14<br>(A-51) | 3.3.1-85 | C, 303 |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 305 |

# Table 3.3.2-19-8-IP2
# Intake Structure System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-8-IP2: Intake Structure System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Orifice | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Orifice | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-19-8-IP2: Intake Structure System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |

# Table 3.3.2-19-9-IP2
# Emergency Diesel Generator System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-9-IP2: Emergency Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Compressor housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Compressor housing | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Condensation (int) | Cracking – Fatigue | TLAA – metal fatigue | -- | -- | H |
| Piping | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Piping | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H2-24<br>(A-30) | 3.3.1-20 | B, 316 |

| Table 3.3.2-19-9-IP2:  Emergency Diesel Generator System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Condensation (int) | Cracking – Fatigue | TLAA – metal fatigue | -- | -- | H |
| Piping | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | VII.F1-1 (A-09) | 3.3.1-27 | E |
| Piping | Pressure boundary | Stainless steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-6 (AP-54) | 3.3.1-32 | D, 316 |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 305 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8 (A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H2-24 (A-30) | 3.3.1-20 | B, 316 |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8 (A-77) | 3.3.1-58 | A |
| Sight glass | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H2-24 (A-30) | 3.3.1-20 | B, 316 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8 (AP-14) | 3.3.1-93 | A |

**Table 3.3.2-19-9-IP2: Emergency Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Sight glass | Pressure boundary | Glass | Fuel oil (int) | None | None | VII.J-9<br>(AP-49) | 3.3.1-93 | A |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H2-24<br>(A-30) | 3.3.1-20 | B, 316 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Condensation (int) | Cracking – Fatigue | TLAA – metal fatigue | -- | -- | H |
| Valve body | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Valve body | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H2-24<br>(A-30) | 3.3.1-20 | B, 316 |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H2-9<br>(AP-44) | 3.3.1-32 | B, 316 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

**Table 3.3.2-19-9-IP2: Emergency Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Condensation (int) | Cracking – Fatigue | TLAA – metal fatigue | -- | -- | H |
| Valve body | Pressure boundary | Stainless steel | Condensation (int) | Loss of material | One-Time Inspection | VII.F1-1 (A-09) | 3.3.1-27 | E |
| Valve body | Pressure boundary | Stainless steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-6 (AP-54) | 3.3.1-32 | D, 316 |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 305 |

# Table 3.3.2-19-10-IP2
# Fuel Oil System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-10-IP2: Fuel Oil System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |

| **Table 3.3.2-19-10-IP2: Fuel Oil System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | B, 316 |

# Table 3.3.2-19-11-IP2
# Fire Protection System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-11-IP2: Fire Protection System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Evacuator | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Evacuator | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |

**Table 3.3.2-19-11-IP2: Fire Protection System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Fire Water System | VII.G-19<br>(A-55) | 3.3.1-69 | B, 303 |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Sight glass | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-11<br>(AP-50) | 3.3.1-93 | A |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |

**Table 3.3.2-19-11-IP2: Fire Protection System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Fire protection foam (int) | Loss of material | Fire Water System | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Fire Water System | VII.G-19<br>(A-55) | 3.3.1-69 | B, 303 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Fire Water System | VII.G-12<br>(A-45) | 3.3.1-70 | B, 303 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.G-13<br>(A-47) | 3.3.1-84 | A, 303 |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

| **Table 3.3.2-19-11-IP2: Fire Protection System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Fire Water System | VII.G-24 (A-33) | 3.3.1-68 | B, 303 |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.G-14 (A-51) | 3.3.1-85 | A, 303 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Fire Water System | VII.G-19 (A-55) | 3.3.1-69 | B, 303 |

## Table 3.3.2-19-12-IP2
## Feedwater System
## Nonsafety-Related Components Potentially Affecting Safety Functions
## Summary of Aging Management Review

**Table 3.3.2-19-12-IP2: Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Filter housing | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Filter housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |

**Table 3.3.2-19-12-IP2: Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5<br>(SP-17) | 3.4.1-14 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |

**Table 3.3.2-19-12-IP2: Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4<br>(SP-16) | 3.4.1-16 | A, 314 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Sight glass | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Sight glass | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VIII.I-5<br>(SP-9) | 3.4.1-40 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VIII.I-8<br>(SP-35) | 3.4.1-40 | A |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |

**Table 3.3.2-19-12-IP2: Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |

**Table 3.3.2-19-12-IP2: Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5<br>(SP-17) | 3.4.1-14 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4<br>(SP-16) | 3.4.1-16 | A, 314 |

# Table 3.3.2-19-13-IP2
# Fresh Water Cooling System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-13-IP2: Fresh Water Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Compressor housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Compressor housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-19-13-IP2: Fresh Water Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 305 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 305 |

**Table 3.3.2-19-13-IP2: Fresh Water Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.G-13<br>(A-47) | 3.3.1-84 | C, 303 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 305 |

# Table 3.3.2-19-14-IP2
# Gas System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-14-IP2: Gas System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Dryer | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Dryer | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |

**Table 3.3.2-19-14-IP2: Gas System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-4<br>(AP-12) | 3.3.1-51 | D |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |

## Table 3.3.2-19-15-IP2
## Main Generator System
## Nonsafety-Related Components Potentially Affecting Safety Functions
## Summary of Aging Management Review

**Table 3.3.2-19-15-IP2: Main Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Filter housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-14<br>(SP-25) | 3.4.1-7 | D, 316 |
| Filter housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-1<br>(S-23) | 3.4.1-24 | E, 304 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-1<br>(S-23) | 3.4.1-24 | E, 304 |

| Table 3.3.2-19-15-IP2: Main Generator System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-14<br>(SP-25) | 3.4.1-7 | D, 316 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-1<br>(S-23) | 3.4.1-24 | E, 304 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-9<br>(SP-38) | 3.4.1-19 | D, 316 |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.E-24<br>(SP-39) | 3.4.1-25 | E, 304 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Pump casing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-14<br>(SP-25) | 3.4.1-7 | D, 316 |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-1<br>(S-23) | 3.4.1-24 | E, 304 |

**Table 3.3.2-19-15-IP2: Main Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Sight glass | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-14<br>(SP-25) | 3.4.1-7 | D, 316 |
| Sight glass | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-1<br>(S-23) | 3.4.1-24 | E, 304 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VIII.I-5<br>(SP-9) | 3.4.1-40 | A |
| Sight glass | Pressure boundary | Glass | Lube oil (int) | None | None | VIII.I-6<br>(SP-10) | 3.4.1-40 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VIII.I-8<br>(SP-35) | 3.4.1-40 | A |
| Strainer housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Strainer housing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.E-24<br>(SP-39) | 3.4.1-25 | E, 304 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |

**Table 3.3.2-19-15-IP2: Main Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tank | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-14<br>(SP-25) | 3.4.1-7 | D, 316 |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-1<br>(S-23) | 3.4.1-24 | E, 304 |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-1<br>(S-23) | 3.4.1-24 | E, 304 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-14<br>(SP-25) | 3.4.1-7 | D, 316 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-1<br>(S-23) | 3.4.1-24 | E, 304 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | VIII.I-2<br>(SP-6) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-3<br>(SP-32) | 3.4.1-18 | D, 316 |

| Table 3.3.2-19-15-IP2: Main Generator System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VIII.E-19 (SP-29) | 3.4.1-35 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.E-16 (SP-8) | 3.4.1-26 | E, 304 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10 (SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-9 (SP-38) | 3.4.1-19 | D, 316 |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.E-24 (SP-39) | 3.4.1-25 | E, 304 |

# Table 3.3.2-19-16-IP2
# House Service Boiler System,
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-16-IP2: House Service Boiler System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Filter housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-16<br>(S-06) | 3.4.1-2 | E, 312 |
| Filter housing | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Filter housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VII.C2-14<br>(A-25) | 3.3.1-47 | E, 304 |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-19-16-IP2: House Service Boiler System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flow element | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Flow element | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-16<br>(S-06) | 3.4.1-2 | E, 312 |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VII.C2-14<br>(A-25) | 3.3.1-47 | E, 304 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | D, 316 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | D, 316 |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |

**Table 3.3.2-19-16-IP2: House Service Boiler System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-16<br>(S-06) | 3.4.1-2 | E, 312 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | C, 311 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VII.C2-14<br>(A-25) | 3.3.1-47 | E, 304 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | D, 316 |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VII.C2-14<br>(A-25) | 3.3.1-47 | E, 304 |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

| **Table 3.3.2-19-16-IP2: House Service Boiler System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Sight glass | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VII.C2-14<br>(A-25) | 3.3.1-47 | E, 304 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-11<br>(AP-50) | 3.3.1-93 | A |
| Steam trap | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-16<br>(S-06) | 3.4.1-2 | E, 312 |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |

| Table 3.3.2-19-16-IP2: House Service Boiler System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-16<br>(S-06) | 3.4.1-2 | E, 312 |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VII.C2-14<br>(A-25) | 3.3.1-47 | E, 304 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | D, 316 |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VII.C2-14<br>(A-25) | 3.3.1-47 | E, 304 |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Thermowell | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Thermowell | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-16<br>(S-06) | 3.4.1-2 | E, 312 |

| Table 3.3.2-19-16-IP2: House Service Boiler System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10 (S-08) | 3.4.1-1 | C, 309 |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VII.C2-14 (A-25) | 3.3.1-47 | E, 304 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Auxiliary Systems | VIII.A-10 (SP-44) | 3.4.1-39 | E, 312 |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-12 (SP-43) | 3.4.1-37 | E, 312 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Auxiliary Systems | VII.C2-11 (AP-60) | 3.3.1-46 | E, 304 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C, 302 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VII.C2-10 (A-52) | 3.3.1-50 | E, 304 |

| **Table 3.3.2-19-16-IP2: House Service Boiler System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Turbine housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Turbine housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-16<br>(S-06) | 3.4.1-2 | E, 312 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | D, 316 |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-16<br>(S-06) | 3.4.1-2 | E, 312 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | C, 311 |

**Table 3.3.2-19-16-IP2: House Service Boiler System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VII.C2-14<br>(A-25) | 3.3.1-47 | E, 304 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-3<br>(AP-44) | 3.3.1-32 | D, 316 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Steam (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | -- | -- | G |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.C2-6<br>(AP-43) | 3.3.1-84 | C, 304 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VII.C2-4<br>(AP-12) | 3.3.1-51 | E, 304 |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | D, 316 |
| Valve body | Pressure boundary | Gray cast iron | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |

**Table 3.3.2-19-16-IP2: House Service Boiler System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Gray cast iron | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Valve body | Pressure boundary | Gray cast iron | Steam (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-16<br>(S-06) | 3.4.1-2 | E, 312 |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.C2-8<br>(A-50) | 3.3.1-85 | C, 304 |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VII.C2-14<br>(A-25) | 3.3.1-47 | E, 304 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-6<br>(AP-54) | 3.3.1-32 | D, 316 |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Auxiliary Systems | VIII.A-10<br>(SP-44) | 3.4.1-39 | E, 312 |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | G |

| Table 3.3.2-19-16-IP2: House Service Boiler System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VIII.A-12<br>(SP-43) | 3.4.1-37 | E, 312 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Auxiliary Systems | VII.C2-11<br>(AP-60) | 3.3.1-46 | E, 304 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Auxiliary Systems | VII.C2-10<br>(A-52) | 3.3.1-50 | E, 304 |

# Table 3.3.2-19-17-IP2
# Heating, Ventilation and Air Conditioning System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-17-IP2: Heating, Ventilation and Air Conditioning System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-2<br>(A-10) | 3.3.1-56 | A |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Duct | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-2<br>(A-10) | 3.3.1-56 | A |
| Duct | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-2<br>(A-10) | 3.3.1-56 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |

**Table 3.3.2-19-17-IP2: Heating, Ventilation and Air Conditioning System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-2<br>(A-10) | 3.3.1-56 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F1-2<br>(A-10) | 3.3.1-56 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |

| Table 3.3.2-19-17-IP2:  Heating, Ventilation and Air Conditioning System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-5<br>(SP-61) | 3.4.1-15 | C, 314 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.C2-7<br>(AP-32) | 3.3.1-84 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-5<br>(SP-61) | 3.4.1-15 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

| Table 3.3.2-19-17-IP2: Heating, Ventilation and Air Conditioning System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |

# Table 3.3.2-19-18-IP2
# Instrument Air System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-18-IP2: Instrument Air System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Compressor housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Compressor housing | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |
| Dryer | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Dryer | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |

| **Table 3.3.2-19-18-IP2: Instrument Air System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | D |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Piping | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18<br>(AP-20) | 3.3.1-98 | A, 301 |
| Silencer | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Silencer | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |

| **Table 3.3.2-19-18-IP2: Instrument Air System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3 (A-80) | 3.3.1-57 | A |
| Strainer housing | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22 (AP-4) | 3.3.1-98 | A, 301 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3 (A-80) | 3.3.1-57 | A |
| Tank | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22 (AP-4) | 3.3.1-98 | A, 301 |
| Trap | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3 (A-80) | 3.3.1-57 | A |
| Trap | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19 (A-38) | 3.3.1-76 | E |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3 (A-80) | 3.3.1-57 | A |
| Valve body | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22 (AP-4) | 3.3.1-98 | A, 301 |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3 (EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Air – treated (int) | None | None | -- | -- | G |

**Table 3.3.2-19-18-IP2: Instrument Air System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18 (AP-20) | 3.3.1-98 | A, 301 |

## Table 3.3.2-19-19-IP2
## Instrument Air Closed Cooling System
## Nonsafety-Related Components Potentially Affecting Safety Functions
## Summary of Aging Management Review

**Table 3.3.2-19-19-IP2: Instrument Air Closed Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-5<br>(A-64) | 3.3.1-77 | C |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | D |

**Table 3.3.2-19-19-IP2: Instrument Air Closed Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Sight glass | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-11<br>(AP-50) | 3.3.1-93 | A |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

| **Table 3.3.2-19-19-IP2: Instrument Air Closed Cooling System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.C2-6<br>(AP-43) | 3.3.1-84 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-4<br>(AP-12) | 3.3.1-51 | D |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

| Table 3.3.2-19-19-IP2: Instrument Air Closed Cooling System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | D |

# Table 3.3.2-19-20-IP2
# Ignition Oil System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-20-IP2: Ignition Oil System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | D, 316 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | D, 316 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-6<br>(AP-54) | 3.3.1-32 | D, 316 |

# Table 3.3.2-19-21-IP2
# Integrated Liquid Waste Handling System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-21-IP2: Integrated Liquid Waste Handling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Pump casing | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |

| **Table 3.3.2-19-21-IP2: Integrated Liquid Waste Handling System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tank | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |

# Table 3.3.2-19-22-IP2
# Lube Oil System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-22-IP2: Lube Oil System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |
| Flex hose | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flex hose | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-14<br>(AP-59) | 3.3.1-33 | D, 316 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-5<br>(AP-39) | 3.3.1-21 | D, 316 |

**Table 3.3.2-19-22-IP2: Lube Oil System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-5<br>(A-64) | 3.3.1-77 | C |
| Orifice | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Orifice | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-14<br>(AP-59) | 3.3.1-33 | D, 316 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

| Table 3.3.2-19-22-IP2: Lube Oil System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Pump casing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17 (AP-30) | 3.3.1-14 | D, 316 |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8 (A-77) | 3.3.1-58 | A |
| Sight glass | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17 (AP-30) | 3.3.1-14 | D, 316 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8 (AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Lube oil (int) | None | None | VII.J-10 (AP-15) | 3.3.1-93 | A |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8 (A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17 (AP-30) | 3.3.1-14 | D, 316 |
| Tank | Pressure boundary | Aluminum | Air – indoor (ext) | None | None | V.F-2 (EP-3) | 3.2.1-50 | C |
| Tank | Pressure boundary | Aluminum | Raw water (int) | Loss of material | One-Time Inspection | VII.G-8 (AP-83) | 3.3.1-62 | E |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8 (A-77) | 3.3.1-58 | A |

**Table 3.3.2-19-22-IP2: Lube Oil System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-8<br>(AP-47) | 3.3.1-26 | D, 316 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-8<br>(AP-47) | 3.3.1-26 | D, 316 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-8<br>(AP-47) | 3.3.1-26 | D, 316 |

| **Table 3.3.2-19-22-IP2: Lube Oil System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-14 (AP-59) | 3.3.1-33 | D, 316 |

# Table 3.3.2-19-23-IP2
# Main Steam System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-23-IP2: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Expansion joint | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Expansion joint | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Expansion joint | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Expansion joint | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |
| Expansion joint | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | A, 314 |

| Table 3.3.2-19-23-IP2: Main Steam System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Expansion joint | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Expansion joint | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | A, 314 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VIII.E-6<br>(S-24) | 3.4.1-31 | C |
| Heat exchanger (shell) | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Heat exchanger (shell) | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VIII.E-2<br>(S-25) | 3.4.1-25 | D |
| Orifice | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Orifice | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |

| Table 3.3.2-19-23-IP2: Main Steam System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Orifice | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Orifice | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Orifice | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | A, 314 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | C |

**Table 3.3.2-19-23-IP2: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | A, 314 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |

| Table 3.3.2-19-23-IP2: Main Steam System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | A, 314 |
| Silencer | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Silencer | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Steam trap | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |

| Table 3.3.2-19-23-IP2: Main Steam System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | A, 314 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | A, 314 |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Thermowell | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Thermowell | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Thermowell | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |

**Table 3.3.2-19-23-IP2: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5 (SP-17) | 3.4.1-14 | A, 314 |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C, 302 |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4 (SP-16) | 3.4.1-16 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10 (SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2 (SP-44) | 3.4.1-39 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3 (SP-43) | 3.4.1-37 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5 (SP-17) | 3.4.1-14 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C, 302 |

| **Table 3.3.2-19-23-IP2: Main Steam System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | A, 314 |
| Turbine housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Turbine housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | C |

**Table 3.3.2-19-23-IP2: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | A, 314 |

# Table 3.3.2-19-24-IP2
# Miscellaneous System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-24-IP2: Miscellaneous System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |

**Table 3.3.2-19-24-IP2: Miscellaneous System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |

# Table 3.3.2-19-25-IP2
# Nuclear Service Grade Makeup System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-25-IP2: Nuclear Service Grade Makeup System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-19-25-IP2: Nuclear Service Grade Makeup System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |

# Table 3.3.2-19-26-IP2
# Post-Accident Containment Air Sample System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-26-IP2: Post-Accident Containment Air Sample System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4 (AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | C |
| Gas analyzer | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Gas analyzer | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Tank | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |

| Table 3.3.2-19-26-IP2: Post-Accident Containment Air Sample System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |

# Table 3.3.2-19-27-IP2
# Post-Accident Containment Air Vent System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-27-IP2: Post-Accident Containment Air Vent System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4 (AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Filter housing | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |

# Table 3.3.2-19-28-IP2
# Primary Sampling System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-28-IP2: Primary Sampling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | C |
| Filter housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Filter housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | C |
| Filter housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C |
| Filter housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8<br>(AP-79) | 3.3.1-91 | C |

**Table 3.3.2-19-28-IP2: Primary Sampling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Plastic | Air – indoor (ext) | None | None | -- | -- | F |
| Piping | Pressure boundary | Plastic | Treated water (int) | None | None | -- | -- | F |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4 (SP-16) | 3.4.1-16 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8 (AP-79) | 3.3.1-91 | C |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4 (SP-16) | 3.4.1-16 | C, 314 |

| **Table 3.3.2-19-28-IP2: Primary Sampling System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Tank | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-40<br>(S-13) | 3.4.1-6 | C, 314 |
| Tank | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | C |
| Tank | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | C |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8<br>(AP-79) | 3.3.1-91 | C |

| **Table 3.3.2-19-28-IP2: Primary Sampling System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Plastic | Air – indoor (ext) | None | None | -- | -- | F |
| Valve body | Pressure boundary | Plastic | Treated water (int) | None | None | -- | -- | F |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | C |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8<br>(AP-79) | 3.3.1-91 | C |

# Table 3.3.2-19-29-IP2
# Primary Water Makeup System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-29-IP2: Primary Water Makeup System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Filter housing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flow element | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

**Table 3.3.2-19-29-IP2: Primary Water Makeup System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Sight glass | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Sight glass | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-13<br>(AP-51) | 3.3.1-93 | A |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tank | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-40<br>(S-13) | 3.4.1-6 | C, 314 |

**Table 3.3.2-19-29-IP2: Primary Water Makeup System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | CASS | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |

# Table 3.3.2-19-30-IP2
# Reactor Coolant System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-30-IP2: Reactor Coolant System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | C |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | C |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-2<br>(RP-04) | 3.3.1-86 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.A-25<br>(EP-46) | 3.2.1-16 | D, 316 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.A-28<br>(E-12) | 3.2.1-48 | C |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | C |

| **Table 3.3.2-19-30-IP2: Reactor Coolant System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.A-25<br>(EP-46) | 3.2.1-16 | D, 316 |
| Rupture disk | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Rupture disk | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.A-28<br>(E-12) | 3.2.1-48 | C |
| Rupture disk | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | C |
| Rupture disk | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Tank | Pressure boundary | Carbon steel coated | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel coated | Treated borated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | F, 313 |

| **Table 3.3.2-19-30-IP2: Reactor Coolant System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.3.1-58 | A |
| Thermowell | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.A-25<br>(EP-46) | 3.2.1-16 | D, 316 |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Thermowell | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.A-28<br>(E-12) | 3.2.1-48 | C |
| Thermowell | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | C |
| Thermowell | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.A-28<br>(E-12) | 3.2.1-48 | C |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | C |

| **Table 3.3.2-19-30-IP2: Reactor Coolant System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.A-25<br>(EP-46) | 3.2.1-16 | D, 316 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.A-28<br>(E-12) | 3.2.1-48 | C |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | C |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |

# Table 3.3.2-19-31-IP2
# Radiation Monitoring System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-31-IP2: Radiation Monitoring System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |

| Table 3.3.2-19-31-IP2: Radiation Monitoring System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |

# Table 3.3.2-19-32-IP2
# River Water Service System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-32-IP2: River Water Service System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

| **Table 3.3.2-19-32-IP2: River Water Service System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Valve body | Pressure boundary | Gray cast iron | Raw water (int) | Loss of material | Selective Leaching | VII.C1-11<br>(A-51) | 3.3.1-85 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |

# Table 3.3.2-19-33-IP2
# Station Air System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-33-IP2: Station Air System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Compressor housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Compressor housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | D |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |

| **Table 3.3.2-19-33-IP2: Station Air System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.D-2<br>(A-26) | 3.3.1-53 | E |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Valve body | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.D-2<br>(A-26) | 3.3.1-53 | E |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.G-9<br>(AP-78) | 3.3.1-28 | E |

# Table 3.3.2-19-34-IP2
# Boiler Blowdown System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-34-IP2: Boiler Blowdown System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-4<br>(S-34) | 3.4.1-22 | I, 310 |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |

| Table 3.3.2-19-34-IP2: Boiler Blowdown System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |

# Table 3.3.2-19-35-IP2
# Spent Fuel Pit Cooling System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-35-IP2: Spent Fuel Pit Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | C |
| Expansion joint | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Expansion joint | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | C |
| Expansion joint | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8<br>(AP-79) | 3.3.1-91 | A |
| Filter housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |

| Table 3.3.2-19-35-IP2: Spent Fuel Pit Cooling System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Filter housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |
| Filter housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8 (AP-79) | 3.3.1-91 | A |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |
| Flow element | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8 (AP-79) | 3.3.1-91 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8 (AP-79) | 3.3.1-91 | A |

**Table 3.3.2-19-35-IP2: Spent Fuel Pit Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8 (AP-79) | 3.3.1-91 | A |
| Strainer housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Strainer housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |
| Strainer housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8 (AP-79) | 3.3.1-91 | A |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Tank | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |

**Table 3.3.2-19-35-IP2: Spent Fuel Pit Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tank | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | C |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8<br>(AP-79) | 3.3.1-91 | A |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | CASS | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | C |
| Valve body | Pressure boundary | CASS | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8<br>(AP-79) | 3.3.1-91 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |

**Table 3.3.2-19-35-IP2: Spent Fuel Pit Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | C |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8<br>(AP-79) | 3.3.1-91 | A |

## Table 3.3.2-19-36-IP2
## Steam Generator Blowdown System
## Nonsafety-Related Components Potentially Affecting Safety Functions
## Summary of Aging Management Review

**Table 3.3.2-19-36-IP2: Steam Generator Blowdown System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25<br>(S-10) | 3.4.1-4 | A, 314 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.F-26<br>(S-16) | 3.4.1-29 | A |

| Table 3.3.2-19-36-IP2: Steam Generator Blowdown System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25 (S-10) | 3.4.1-4 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10 (SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-24 (SP-17) | 3.4.1-14 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C, 302 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-23 (SP-16) | 3.4.1-16 | A, 314 |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10 (SP-12) | 3.4.1-41 | A |
| Tank | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.E-38 (SP-42) | 3.4.1-14 | C, 314 |
| Tank | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-40 (S-13) | 3.4.1-6 | C, 314 |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7 (S-29) | 3.4.1-28 | A |

**Table 3.3.2-19-36-IP2: Steam Generator Blowdown System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25<br>(S-10) | 3.4.1-4 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-24<br>(SP-17) | 3.4.1-14 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-23<br>(SP-16) | 3.4.1-16 | A, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.F-26<br>(S-16) | 3.4.1-29 | A |

**Table 3.3.2-19-36-IP2: Steam Generator Blowdown System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25<br>(S-10) | 3.4.1-4 | A, 314 |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | CASS | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-24<br>(SP-17) | 3.4.1-14 | A, 314 |
| Valve body | Pressure boundary | CASS | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | CASS | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-23<br>(SP-16) | 3.4.1-16 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-24<br>(SP-17) | 3.4.1-14 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-23<br>(SP-16) | 3.4.1-16 | A, 314 |

# Table 3.3.2-19-37-IP2
# Safety Injection System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-37-IP2: Safety Injection System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | C |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | A |

| Table 3.3.2-19-37-IP2: Safety Injection System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tank | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |

# Table 3.3.2-19-38-IP2
# Secondary Sampling System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-38-IP2: Secondary Sampling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Heat exchanger (shell) | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Heat exchanger (shell) | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | D |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | G |

| **Table 3.3.2-19-38-IP2: Secondary Sampling System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-5<br>(SP-61) | 3.4.1-15 | C, 314 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |

| Table 3.3.2-19-38-IP2: Secondary Sampling System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.C2-7 (AP-32) | 3.3.1-84 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-5 (SP-61) | 3.4.1-15 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10 (SP-44) | 3.4.1-39 | C |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12 (SP-43) | 3.4.1-37 | C |

# Table 3.3.2-19-39-IP2
# Service Water System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-39-IP2: Service Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | Bolting Integrity | VII.D-1<br>(A-103) | 3.3.1-44 | C |
| Bolting | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | Bolting Integrity | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-5<br>(A-64) | 3.3.1-77 | A |
| Piping | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Piping | Pressure boundary | Plastic | Condensation (ext) | None | None | -- | -- | F |
| Piping | Pressure boundary | Plastic | Raw water (int) | None | None | -- | -- | F |

**Table 3.3.2-19-39-IP2: Service Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Piping | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Strainer housing | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Thermowell | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Thermowell | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Thermowell | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Thermowell | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Valve body | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |

| Table 3.3.2-19-39-IP2:  Service Water System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | CASS | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Valve body | Pressure boundary | CASS | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Valve body | Pressure boundary | Copper alloy | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Valve body | Pressure boundary | Copper alloy | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-9<br>(A-44) | 3.3.1-81 | A |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Raw water (int) | Loss of material | Selective Leaching | VII.C1-10<br>(A-47) | 3.3.1-84 | A |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-9<br>(A-44) | 3.3.1-81 | A |
| Valve body | Pressure boundary | Gray cast iron | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Raw water (int) | Loss of material | Selective Leaching | VII.C1-11<br>(A-51) | 3.3.1-85 | A |
| Valve body | Pressure boundary | Gray cast iron | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |

| **Table 3.3.2-19-39-IP2: Service Water System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Plastic | Condensation (ext) | None | None | -- | -- | F |
| Valve body | Pressure boundary | Plastic | Raw water (int) | None | None | -- | -- | F |
| Valve body | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Valve body | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |

# Table 3.3.2-19-40-IP2
# Technical Support Center Diesel System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-40-IP2: Technical Support Center Diesel System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | D, 316 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-10<br>(A-30) | 3.3.1-20 | D, 316 |

# Table 3.3.2-19-41-IP2
# Main Turbine System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-41-IP2: Main Turbine System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-14<br>(SP-25) | 3.4.1-7 | B, 316 |
| Turbine housing | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Turbine housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | A, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-14<br>(SP-25) | 3.4.1-7 | B, 316 |

**Table 3.3.2-19-41-IP2: Main Turbine System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-9<br>(SP-38) | 3.4.1-19 | B, 316 |

# Table 3.3.2-19-42-IP2
# Waste Disposal System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-42-IP2: Waste Disposal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Filter housing | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Filter housing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flow element | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |

**Table 3.3.2-19-42-IP2: Waste Disposal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flow element | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F1-3<br>(A-08) | 3.3.1-72 | E |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Piping | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

| Table 3.3.2-19-42-IP2: Waste Disposal System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Pump casing | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Sight glass | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Raw water (int) | None | None | VII.J-11<br>(AP-50) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated borated water (int) | None | None | VII.J-12<br>(AP-52) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Sight glass | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |

**Table 3.3.2-19-42-IP2: Waste Disposal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Strainer housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Strainer housing | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Strainer housing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A38) | 3.3.1-76 | E |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |

**Table 3.3.2-19-42-IP2: Waste Disposal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tank | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Tank | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Thermowell | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Thermowell | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F1-3<br>(A-08) | 3.3.1-72 | E |
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |

**Table 3.3.2-19-42-IP2: Waste Disposal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | CASS | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |

# Table 3.3.2-19-43-IP2
# Water Treatment Plant System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-43-IP2: Water Treatment Plant System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-19-43-IP2: Water Treatment Plant System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Piping | Pressure boundary | Plastic | Air – indoor (ext) | None | None | -- | -- | F |
| Piping | Pressure boundary | Plastic | Treated water (int) | None | None | -- | -- | F |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 305 |

**Table 3.3.2-19-43-IP2: Water Treatment Plant System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8 (A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8 (A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8 (A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8 (A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10 (S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16 (S-06) | 3.4.1-2 | C, 314 |

**Table 3.3.2-19-43-IP2: Water Treatment Plant System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.G-14<br>(A-51) | 3.3.1-85 | C, 303 |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 305 |

# Table 3.3.2-19-1-IP3
# Ammonia / Morpholine Addition System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-1-IP3: Ammonia / Morpholine Addition System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |

# Table 3.3.2-19-2-IP3
# Auxiliary Steam and Condensate Return System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-2-IP3: Auxiliary Steam and Condensate Return System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Heater housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heater housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Heater housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Heater housing | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Heater housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-19-2-IP3: Auxiliary Steam and Condensate Return System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | C, 311 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

| Table 3.3.2-19-2-IP3: Auxiliary Steam and Condensate Return System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Sight glass | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Sight glass | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-11<br>(AP-50) | 3.3.1-93 | A |
| Steam trap | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-19-2-IP3: Auxiliary Steam and Condensate Return System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Thermowell | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Thermowell | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |

**Table 3.3.2-19-2-IP3: Auxiliary Steam and Condensate Return System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |

**Table 3.3.2-19-2-IP3: Auxiliary Steam and Condensate Return System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C, 309 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | C, 311 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.C2-7<br>(AP-32) | 3.3.1-84 | C, 314 |

| Table 3.3.2-19-2-IP3: Auxiliary Steam and Condensate Return System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-5<br>(SP-61) | 3.4.1-15 | C, 314 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |

| **Table 3.3.2-19-2-IP3: Auxiliary Steam and Condensate Return System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |

# Table 3.3.2-19-3-IP3
# Boron and Layup Chemical Addition System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-3-IP3: Boron and Layup Chemical Addition System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | C |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-13<br>(AP-51) | 3.3.1-93 | A |

| Table 3.3.2-19-3-IP3: Boron and Layup Chemical Addition System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Sight glass | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Sight glass | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Tank | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |

# Table 3.3.2-19-4-IP3
# Condenser Air Removal System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-4-IP3: Condenser Air Removal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Ejector | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Ejector | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

| Table 3.3.2-19-4-IP3: Condenser Air Removal System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-37<br>(S-19) | 3.4.1-3 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |

| **Table 3.3.2-19-4-IP3: Condenser Air Removal System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Sight glass | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-13<br>(AP-51) | 3.3.1-93 | A |
| Steam trap | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |

**Table 3.3.2-19-4-IP3: Condenser Air Removal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | CASS | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |

| **Table 3.3.2-19-4-IP3: Condenser Air Removal System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | CASS | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | F |
| Valve body | Pressure boundary | CASS | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Valve body | Pressure boundary | CASS | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |

# Table 3.3.2-19-5-IP3
# Chlorination System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-5-IP3: Chlorination System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4 (AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8 (A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.G-14 (A-51) | 3.3.1-85 | C, 303 |
| Piping | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8 (A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.G-14 (A-51) | 3.3.1-85 | C, 303 |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |

## Table 3.3.2-19-6-IP3
## Condensate System
## Nonsafety-Related Components Potentially Affecting Safety Functions
## Summary of Aging Management Review

**Table 3.3.2-19-6-IP3: Condensate System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.E-35<br>(S-16) | 3.4.1-29 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-29<br>(SP-16) | 3.4.1-16 | A, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |

**Table 3.3.2-19-6-IP3: Condensate System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.E-35<br>(S-16) | 3.4.1-29 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-29<br>(SP-16) | 3.4.1-16 | A, 314 |

## Table 3.3.2-19-7-IP3
## Condensate Polisher System
## Nonsafety-Related Components Potentially Affecting Safety Functions
## Summary of Aging Management Review

**Table 3.3.2-19-7-IP3: Condensate Polisher System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-29<br>(SP-16) | 3.4.1-16 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-29<br>(SP-16) | 3.4.1-16 | A, 314 |

# Table 3.3.2-19-8-IP3
# Condensate Pump Discharge System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-8-IP3: Condensate Pump Discharge System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-29<br>(SP-16) | 3.4.1-16 | A, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |

**Table 3.3.2-19-8-IP3: Condensate Pump Discharge System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-29<br>(SP-16) | 3.4.1-16 | A, 314 |

# Table 3.3.2-19-9-IP3
# Condensate Pump Suction System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-9-IP3: Condensate Pump Suction System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |

| **Table 3.3.2-19-9-IP3: Condensate Pump Suction System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |

# Table 3.3.2-19-10-IP3
# Containment Spray System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-10-IP3: Containment Spray System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | C |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | A |

**Table 3.3.2-19-10-IP3: Containment Spray System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | -- | -- | G, 318 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12 (EP-18) | 3.2.1-53 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27 (EP-41) | 3.2.1-49 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | -- | -- | G, 318 |

# Table 3.3.2-19-11-IP3
# Chemical and Volume Control System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-11-IP3: Chemical and Volume Control System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | C |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |

**Table 3.3.2-19-11-IP3: Chemical and Volume Control System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tank | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Thermowell | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | CASS | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | A |

# Table 3.3.2-19-12-IP3
# Circulating Water System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-12-IP3: Circulating Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Expansion joint | Pressure boundary | Elastomer | Air – indoor (ext) | Change in material properties | Periodic surveillance and preventive maintenance | VII.F1-7<br>(A-17) | 3.3.1-11 | E |
| Expansion joint | Pressure boundary | Elastomer | Air – indoor (ext) | Cracking | Periodic surveillance and preventive maintenance | VII.F1-7<br>(A-17) | 3.3.1-11 | E |
| Expansion joint | Pressure boundary | Elastomer | Raw water (int) | Change in material properties | Periodic surveillance and preventive maintenance | VII.C1-1<br>(AP-75) | 3.3.1-75 | E |
| Expansion joint | Pressure boundary | Elastomer | Raw water (int) | Cracking | Periodic surveillance and preventive maintenance | VII.C1-1<br>(AP-75) | 3.3.1-75 | E |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |

**Table 3.3.2-19-12-IP3: Circulating Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VIII.G-36<br>(S-12) | 3.4.1-8 | E |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Pump casing | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VIII.G-36<br>(S-12) | 3.4.1-8 | E |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Sight glass | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VIII.G-36<br>(S-12) | 3.4.1-8 | E |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VIII.I-5<br>(SP-9) | 3.4.1-40 | A |
| Sight glass | Pressure boundary | Glass | Raw water (int) | None | None | VIII.I-7<br>(SP-34) | 3.4.1-40 | A |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Tank | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VIII.G-36<br>(S-12) | 3.4.1-8 | E |

| **Table 3.3.2-19-12-IP3: Circulating Water System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Thermowell | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VIII.G-36<br>(S-12) | 3.4.1-8 | E |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VIII.G-36<br>(S-12) | 3.4.1-8 | E |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | CASS | Raw water (int) | Loss of material | One-Time Inspection | VIII.E-27<br>(SP-36) | 3.4.1-32 | E |

# Table 3.3.2-19-13-IP3
# City Water Makeup System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-13-IP3: City Water Makeup System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Piping | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Piping | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Piping | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.G-14<br>(A-51) | 3.3.1-85 | C, 303 |

**Table 3.3.2-19-13-IP3: City Water Makeup System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | CASS | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 305 |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |

**Table 3.3.2-19-13-IP3: City Water Makeup System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.G-13<br>(A-47) | 3.3.1-84 | C, 303 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.G-14<br>(A-51) | 3.3.1-85 | C, 303 |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 305 |

## Table 3.3.2-19-14-IP3
## Condensate Transfer System
## Nonsafety-Related Components Potentially Affecting Safety Functions
## Summary of Aging Management Review

**Table 3.3.2-19-14-IP3: Condensate Transfer System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Ejector | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Ejector | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |
| Expansion joint | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Expansion joint | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.E-30<br>(SP-17) | 3.4.1-14 | A, 314 |
| Expansion joint | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |

**Table 3.3.2-19-14-IP3: Condensate Transfer System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Expansion joint | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-29<br>(SP-16) | 3.4.1-16 | A, 314 |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-37<br>(S-19) | 3.4.1-3 | A, 314 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.E-35<br>(S-16) | 3.4.1-29 | A |

| **Table 3.3.2-19-14-IP3: Condensate Transfer System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.E-30<br>(SP-17) | 3.4.1-14 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-29<br>(SP-16) | 3.4.1-16 | A, 314 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Sight glass | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |

**Table 3.3.2-19-14-IP3: Condensate Transfer System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Sight glass | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VIII.I-5<br>(SP-9) | 3.4.1-40 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VIII.I-8<br>(SP-35) | 3.4.1-40 | A |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-40<br>(S-13) | 3.4.1-6 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |

| Table 3.3.2-19-14-IP3: Condensate Transfer System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.E-30<br>(SP-17) | 3.4.1-14 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-29<br>(SP-16) | 3.4.1-16 | A, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.E-35<br>(S-16) | 3.4.1-29 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-34<br>(S-10) | 3.4.1-4 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.E-30<br>(SP-17) | 3.4.1-14 | A, 314 |

| Table 3.3.2-19-14-IP3: Condensate Transfer System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-29<br>(SP-16) | 3.4.1-16 | A, 314 |

# Table 3.3.2-19-15-IP3
# Demineralized Water System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-15-IP3: Demineralized Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-19-15-IP3: Demineralized Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |

# Table 3.3.2-19-16-IP3
# Emergency Diesel Generator System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-16-IP3: Emergency Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Condensation (int) | Cracking – Fatigue | TLAA – metal fatigue | -- | -- | H |
| Piping | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.H2-21<br>(A-23) | 3.3.1-71 | E |
| Piping | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H2-24<br>(A-30) | 3.3.1-20 | B, 316 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-6<br>(AP-54) | 3.3.1-32 | D, 316 |

**Table 3.3.2-19-16-IP3: Emergency Diesel Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H2-24<br>(A-30) | 3.3.1-20 | B, 316 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H1-6<br>(AP-54) | 3.3.1-32 | D, 316 |

# Table 3.3.2-19-17-IP3
# Emergency Generators System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-17-IP3: Emergency Generators System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H2-24<br>(A-30) | 3.3.1-20 | B, 316 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H2-24<br>(A-30) | 3.3.1-20 | B, 316 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Fuel oil (int) | Loss of material | Diesel Fuel Monitoring | VII.H2-24<br>(A-30) | 3.3.1-20 | B, 316 |

# Table 3.3.2-19-18-IP3
# Extraction Steam System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-18-IP3: Extraction Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Expansion joint | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Expansion joint | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Expansion joint | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Expansion joint | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Orifice | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |

| Table 3.3.2-19-18-IP3: Extraction Steam System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Orifice | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Orifice | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Orifice | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Orifice | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.C-2<br>(SP-17) | 3.4.1-14 | A, 314 |
| Orifice | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Orifice | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-1<br>(SP-16) | 3.4.1-16 | A, 314 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.C-5<br>(S-15) | 3.4.1-29 | A |

| Table 3.3.2-19-18-IP3: Extraction Steam System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-4<br>(S-06) | 3.4.1-2 | A, 314 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-7<br>(S-10) | 3.4.1-4 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.C-2<br>(SP-17) | 3.4.1-14 | A, 314 |

**Table 3.3.2-19-18-IP3: Extraction Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-1<br>(SP-16) | 3.4.1-16 | A, 314 |
| Steam trap | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.C-5<br>(S-15) | 3.4.1-29 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-4<br>(S-06) | 3.4.1-2 | A, 314 |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-4<br>(S-06) | 3.4.1-2 | A, 314 |

| **Table 3.3.2-19-18-IP3: Extraction Steam System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-7<br>(S-10) | 3.4.1-4 | A, 314 |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Thermowell | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Thermowell | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-4<br>(S-06) | 3.4.1-2 | A, 314 |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-7<br>(S-10) | 3.4.1-4 | A, 314 |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Thermowell | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |

| Table 3.3.2-19-18-IP3: Extraction Steam System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Thermowell | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Thermowell | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12 (SP-43) | 3.4.1-37 | C |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.C-2 (SP-17) | 3.4.1-14 | A, 314 |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C, 302 |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-1 (SP-16) | 3.4.1-16 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10 (SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10 (SP-44) | 3.4.1-39 | C |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12 (SP-43) | 3.4.1-37 | C |

**Table 3.3.2-19-18-IP3: Extraction Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.C-2<br>(SP-17) | 3.4.1-14 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-1<br>(SP-16) | 3.4.1-16 | A, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.C-5<br>(S-15) | 3.4.1-29 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-4<br>(S-06) | 3.4.1-2 | A, 314 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | C |

**Table 3.3.2-19-18-IP3: Extraction Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-7<br>(S-10) | 3.4.1-4 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.C-2<br>(SP-17) | 3.4.1-14 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-1<br>(SP-16) | 3.4.1-16 | A, 314 |

# Table 3.3.2-19-19-IP3
# Floor Drains
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-19-IP3: Floor Drains**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |

# Table 3.3.2-19-20-IP3
# Fire Water System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-20-IP3: Fire Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Fire protection foam (int) | Loss of material | Fire Water System | -- | -- | G |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Piping | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Piping | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.G-14<br>(A-51) | 3.3.1-85 | A, 303 |

**Table 3.3.2-19-20-IP3: Fire Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Fire protection foam (int) | Loss of material | Fire Water System | -- | -- | G |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Fire protection foam (int) | Loss of material | Fire Water System | -- | -- | G |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Fire Water System | VII.G-12<br>(A-45) | 3.3.1-70 | B, 303 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.G-13<br>(A-47) | 3.3.1-84 | A, 303 |

| Table 3.3.2-19-20-IP3: Fire Water System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Gray cast iron | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Fire Water System | VII.G-24<br>(A-33) | 3.3.1-68 | B, 303 |
| Valve body | Pressure boundary | Gray cast iron | Treated water (int) | Loss of material | Selective Leaching | VII.G-14<br>(A-51) | 3.3.1-85 | A, 303 |

# Table 3.3.2-19-21-IP3
# Fuel Storage Building HVAC System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-21-IP3: Fuel Storage Building HVAC System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-2<br>(A-10) | 3.3.1-56 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-2<br>(A-10) | 3.3.1-56 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |

**Table 3.3.2-19-21-IP3: Fuel Storage Building HVAC System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |

# Table 3.3.2-19-22-IP3
# Feedwater System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-22-IP3: Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5<br>(SP-17) | 3.4.1-14 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |

| **Table 3.3.2-19-22-IP3: Feedwater System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4<br>(SP-16) | 3.4.1-16 | A, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5<br>(SP-17) | 3.4.1-14 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4<br>(SP-16) | 3.4.1-16 | A, 314 |

# Table 3.3.2-19-23-IP3
# Main Feedwater Pump and Services
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-23-IP3: Main Feedwater Pump and Services**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Expansion joint | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Expansion joint | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Expansion joint | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Expansion joint | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Expansion joint | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5<br>(SP-17) | 3.4.1-14 | A, 314 |

**Table 3.3.2-19-23-IP3: Main Feedwater Pump and Services**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Expansion joint | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Expansion joint | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4<br>(SP-16) | 3.4.1-16 | A, 314 |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Filter housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.D1-6<br>(SP-25) | 3.4.1-7 | B, 316 |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Flow element | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Flow element | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |

**Table 3.3.2-19-23-IP3: Main Feedwater Pump and Services**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.G-6<br>(S-17) | 3.4.1-12 | D, 316 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VIII.E-6<br>(S-24) | 3.4.1-31 | C |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VIII.A-1<br>(S-23) | 3.4.1-24 | D |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |

**Table 3.3.2-19-23-IP3: Main Feedwater Pump and Services**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5<br>(SP-17) | 3.4.1-14 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4<br>(SP-16) | 3.4.1-16 | A, 314 |

**Table 3.3.2-19-23-IP3: Main Feedwater Pump and Services**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Steam trap | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |

| **Table 3.3.2-19-23-IP3: Main Feedwater Pump and Services** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Tank | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.D1-6<br>(SP-25) | 3.4.1-7 | B, 316 |
| Turbine housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Turbine housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.D1-6<br>(SP-25) | 3.4.1-7 | B, 316 |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |

**Table 3.3.2-19-23-IP3: Main Feedwater Pump and Services**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.D1-3<br>(SP-38) | 3.4.1-19 | B, 316 |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |

**Table 3.3.2-19-23-IP3: Main Feedwater Pump and Services**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5<br>(SP-17) | 3.4.1-14 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4<br>(SP-16) | 3.4.1-16 | A, 314 |

# Table 3.3.2-19-24-IP3
# Gland Seal Steam System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-24-IP3: Gland Seal Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | C |

**Table 3.3.2-19-24-IP3: Gland Seal Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Rupture disk | Pressure boundary | Nickel alloy | Air – indoor (ext) | None | None | VIII.I-9<br>(SP-11) | 3.4.1-41 | A |

| Table 3.3.2-19-24-IP3: Gland Seal Steam System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Rupture disk | Pressure boundary | Nickel alloy | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | -- | -- | G |
| Rupture disk | Pressure boundary | Nickel alloy | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | G |
| Rupture disk | Pressure boundary | Nickel alloy | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |

| Table 3.3.2-19-24-IP3: Gland Seal Steam System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.A-17<br>(S-15) | 3.4.1-29 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | C |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |

**Table 3.3.2-19-24-IP3: Gland Seal Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10 (SP-44) | 3.4.1-39 | C |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12 (SP-43) | 3.4.1-37 | C |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5 (SP-17) | 3.4.1-14 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4 (SP-16) | 3.4.1-16 | C, 314 |

# Table 3.3.2-19-25-IP3
# Gaseous Waste Disposal System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-25-IP3: Gaseous Waste Disposal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Compressor housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Compressor housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Orifice | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Orifice | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | D |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

| **Table 3.3.2-19-25-IP3: Gaseous Waste Disposal System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F1-3<br>(A-08) | 3.3.1-72 | E |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Sight glass | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-11<br>(AP-50) | 3.3.1-93 | A |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-19-25-IP3: Gaseous Waste Disposal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | D |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.F1-3<br>(A-08) | 3.3.1-72 | E |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | CASS | Condensation (int) | Loss of material | One-Time Inspection | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Valve body | Pressure boundary | CASS | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | D |

# Table 3.3.2-19-26-IP3
# Hydrazine Addition System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-26-IP3: Hydrazine Addition System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4 (AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |
| Sight glass | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Sight glass | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |

| Table 3.3.2-19-26-IP3: Hydrazine Addition System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-11<br>(AP-50) | 3.3.1-93 | A |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tank | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 318 |

# Table 3.3.2-19-27-IP3
# Heater Drain / Moisture Separator Drains / Vents System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-27-IP3: Heater Drain / Moisture Separator Drains / Vents System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Expansion joint | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Expansion joint | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Expansion joint | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Expansion joint | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |

**Table 3.3.2-19-27-IP3: Heater Drain / Moisture Separator Drains / Vents System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Orifice | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Orifice | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Orifice | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Orifice | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |

| Table 3.3.2-19-27-IP3: Heater Drain / Moisture Separator Drains / Vents System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Pump casing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Sight glass | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Sight glass | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VIII.I-5<br>(SP-9) | 3.4.1-40 | A |

**Table 3.3.2-19-27-IP3: Heater Drain / Moisture Separator Drains / Vents System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Sight glass | Pressure boundary | Glass | Steam (int) | None | None | -- | -- | G |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Tank | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Thermowell | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Thermowell | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |

**Table 3.3.2-19-27-IP3: Heater Drain / Moisture Separator Drains / Vents System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |

**Table 3.3.2-19-27-IP3: Heater Drain / Moisture Separator Drains / Vents System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |

# Table 3.3.2-19-28-IP3
# High Pressure Steam Dump System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-28-IP3: High Pressure Steam Dump System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |

| **Table 3.3.2-19-28-IP3: High Pressure Steam Dump System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |

# Table 3.3.2-19-29-IP3
# Instrument Air System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-29-IP3: Instrument Air System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Compressor housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Compressor housing | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |
| Dryer | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Dryer | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |

| **Table 3.3.2-19-29-IP3: Instrument Air System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flow element | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18<br>(AP-20) | 3.3.1-98 | A, 301 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | D |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Piping | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18<br>(AP-20) | 3.3.1-98 | A, 301 |

**Table 3.3.2-19-29-IP3: Instrument Air System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Silencer | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Silencer | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Strainer housing | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Tank | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |
| Trap | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Trap | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Valve body | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | A, 301 |

| **Table 3.3.2-19-29-IP3: Instrument Air System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Air – treated (int) | None | None | VII.J-18 (AP-20) | 3.3.1-98 | A, 301 |

# Table 3.3.2-19-30-IP3
# Instrument Air Closed Cooling System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-30-IP3: Instrument Air Closed Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | D |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-19-30-IP3: Instrument Air Closed Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Sight glass | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-11<br>(AP-50) | 3.3.1-93 | A |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |

| Table 3.3.2-19-30-IP3: Instrument Air Closed Cooling System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | D |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.C2-6<br>(AP-43) | 3.3.1-84 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-4<br>(AP-12) | 3.3.1-51 | D |

| Table 3.3.2-19-30-IP3: Instrument Air Closed Cooling System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | D |

# Table 3.3.2-19-31-IP3
# Lube Oil System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-31-IP3: Lube Oil System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-5<br>(AP-39) | 3.3.1-21 | D, 316 |
| Heater housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heater housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |

| Table 3.3.2-19-31-IP3: Lube Oil System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Orifice | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Orifice | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-14<br>(AP-59) | 3.3.1-33 | D, 316 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Sight glass | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |

**Table 3.3.2-19-31-IP3: Lube Oil System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Lube oil (int) | None | None | VII.J-10<br>(AP-15) | 3.3.1-93 | A |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-8<br>(AP-47) | 3.3.1-26 | D, 316 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | CASS | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-14<br>(AP-59) | 3.3.1-33 | D, 316 |

| Table 3.3.2-19-31-IP3: Lube Oil System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-14 (AP-59) | 3.3.1-33 | D, 316 |

# Table 3.3.2-19-32-IP3
# Low Pressure Steam Dump System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-32-IP3: Low Pressure Steam Dump System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-4<br>(S-34) | 3.4.1-22 | I, 310 |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Steam trap | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Steam trap | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Steam trap | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |

**Table 3.3.2-19-32-IP3: Low Pressure Steam Dump System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |

**Table 3.3.2-19-32-IP3: Low Pressure Steam Dump System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |

# Table 3.3.2-19-33-IP3
# Liquid Waste Disposal System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-33-IP3: Liquid Waste Disposal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Filter housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Filter housing | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-19-33-IP3: Liquid Waste Disposal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flow element | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flow element | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 305 |

| Table 3.3.2-19-33-IP3: Liquid Waste Disposal System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Pump casing | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Sight glass | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Raw water (int) | None | None | VII.J-11<br>(AP-50) | 3.3.1-93 | A |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-19-33-IP3: Liquid Waste Disposal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Strainer housing | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Strainer housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Strainer housing | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tank | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |

**Table 3.3.2-19-33-IP3: Liquid Waste Disposal System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | CASS | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15 (A-54) | 3.3.1-79 | E |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15 (A-54) | 3.3.1-79 | E |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 305 |

# Table 3.3.2-19-34-IP3
# Main Feedwater System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-34-IP3: Main Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-4<br>(S-34) | 3.4.1-22 | I, 310 |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Flow element | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5<br>(SP-17) | 3.4.1-14 | A, 314 |
| Flow element | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |

**Table 3.3.2-19-34-IP3: Main Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flow element | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4 (SP-16) | 3.4.1-16 | A, 314 |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7 (S-29) | 3.4.1-28 | I, 310 |
| Filter housing | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10 (S-08) | 3.4.1-1 | C |
| Filter housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8 (S-10) | 3.4.1-4 | A, 314 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7 (S-29) | 3.4.1-28 | I, 310 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8 (S-10) | 3.4.1-4 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7 (S-29) | 3.4.1-28 | I, 310 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10 (S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9 (S-16) | 3.4.1-29 | A |

**Table 3.3.2-19-34-IP3: Main Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5<br>(SP-17) | 3.4.1-14 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4<br>(SP-16) | 3.4.1-16 | A, 314 |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |

| Table 3.3.2-19-34-IP3: Main Feedwater System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5 (SP-17) | 3.4.1-14 | A, 314 |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C, 302 |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4 (SP-16) | 3.4.1-16 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10 (SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5 (SP-17) | 3.4.1-14 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C, 302 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4 (SP-16) | 3.4.1-16 | A, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7 (S-29) | 3.4.1-28 | I, 310 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10 (S-08) | 3.4.1-1 | C |

| Table 3.3.2-19-34-IP3: Main Feedwater System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5<br>(SP-17) | 3.4.1-14 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4<br>(SP-16) | 3.4.1-16 | A, 314 |

# Table 3.3.2-19-35-IP3
# Main Steam System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-35-IP3: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-4<br>(S-34) | 3.4.1-22 | I, 310 |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Orifice | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Orifice | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Orifice | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | A |

**Table 3.3.2-19-35-IP3: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | A, 314 |

**Table 3.3.2-19-35-IP3: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | A, 314 |
| Silencer | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Silencer | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Steam trap | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |

| **Table 3.3.2-19-35-IP3: Main Steam System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | A, 314 |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Thermowell | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Thermowell | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | A, 314 |

| **Table 3.3.2-19-35-IP3: Main Steam System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | A, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |

| **Table 3.3.2-19-35-IP3: Main Steam System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | C |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |

| Table 3.3.2-19-35-IP3: Main Steam System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | A, 314 |

# Table 3.3.2-19-36-IP3
# Main Turbine Generator System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-36-IP3: Main Turbine Generator System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-4<br>(S-34) | 3.4.1-22 | I, 310 |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | A, 314 |
| Rupture disk | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Rupture disk | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | A |
| Rupture disk | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |

| Table 3.3.2-19-36-IP3: Main Turbine Generator System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Rupture disk | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | A |
| Turbine housing | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Turbine housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | A, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-14<br>(SP-25) | 3.4.1-7 | B, 316 |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | A, 314 |

# Table 3.3.2-19-37-IP3
# Nitrogen System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-37-IP3: Nitrogen System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Piping | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Piping | Pressure boundary | Copper alloy | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |

| Table 3.3.2-19-37-IP3: Nitrogen System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Gas (int) | None | None | VII.J-4<br>(AP-9) | 3.3.1-97 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Gas (int) | None | None | VII.J-19<br>(AP-22) | 3.3.1-97 | A |
| Vaporizer | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Vaporizer | Pressure boundary | Carbon steel | Gas (int) | None | None | VII.J-23<br>(AP-6) | 3.3.1-97 | A |

# Table 3.3.2-19-38-IP3
# Nuclear Equipment Drains System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-38-IP3: Nuclear Equipment Drains System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Piping | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Piping | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |

**Table 3.3.2-19-38-IP3: Nuclear Equipment Drains System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Tank | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Tubing | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Tubing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |

**Table 3.3.2-19-38-IP3: Nuclear Equipment Drains System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | CASS | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Valve body | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | One-Time Inspection | VII.C1-15<br>(A-54) | 3.3.1-79 | E |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |

# Table 3.3.2-19-39-IP3
# Primary Auxiliary Building HVAC System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-39-IP3: Primary Auxiliary Building HVAC System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-2<br>(A-10) | 3.3.1-56 | A |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Duct | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-2<br>(A-10) | 3.3.1-56 | A |
| Duct | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-2<br>(A-10) | 3.3.1-56 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |

| **Table 3.3.2-19-39-IP3: Primary Auxiliary Building HVAC System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-8<br>(AP-41) | 3.3.1-59 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-37<br>(S-19) | 3.4.1-3 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-2<br>(A-10) | 3.3.1-56 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F2-2<br>(A-10) | 3.3.1-56 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |

# Table 3.3.2-19-40-IP3
# Process Radiation Monitoring System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-40-IP3: Process Radiation Monitoring System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |

**Table 3.3.2-19-40-IP3: Process Radiation Monitoring System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Pump casing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4 (SP-16) | 3.4.1-16 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5 (SP-17) | 3.4.1-14 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4 (SP-16) | 3.4.1-16 | C, 314 |

# Table 3.3.2-19-41-IP3
# Primary Plant Sampling System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-41-IP3: Primary Plant Sampling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | C |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |

| Table 3.3.2-19-41-IP3: Primary Plant Sampling System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8 (AP-79) | 3.3.1-91 | C |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Tank | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |
| Tank | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27 (EP-41) | 3.2.1-49 | C |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |

**Table 3.3.2-19-41-IP3: Primary Plant Sampling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8<br>(AP-79) | 3.3.1-91 | C |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | C |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C |

**Table 3.3.2-19-41-IP3: Primary Plant Sampling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8<br>(AP-79) | 3.3.1-91 | C |

# Table 3.3.2-19-42-IP3
# Primary Water Makeup System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-42-IP3: Primary Water Makeup System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flow element | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

| **Table 3.3.2-19-42-IP3: Primary Water Makeup System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tank | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.E-40<br>(S-13) | 3.4.1-6 | C, 314 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | CASS | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |

**Table 3.3.2-19-42-IP3: Primary Water Makeup System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |

# Table 3.3.2-19-43-IP3
# Pressurizer System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-43-IP3: Pressurizer System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | C |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-2<br>(RP-04) | 3.3.1-86 | C |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.A-28<br>(E-12) | 3.2.1-48 | C |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | C |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | C, 314 |

**Table 3.3.2-19-43-IP3: Pressurizer System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Rupture disk | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Rupture disk | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.A-28<br>(E-12) | 3.2.1-48 | C |
| Rupture disk | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | C |
| Rupture disk | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Tank | Pressure boundary | Carbon steel coated | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | C |
| Tank | Pressure boundary | Carbon steel coated | Treated borated water > 140°F (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | F, 313 |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Thermowell | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.A-28<br>(E-12) | 3.2.1-48 | C |

**Table 3.3.2-19-43-IP3: Pressurizer System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | C |
| Thermowell | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.A-28<br>(E-12) | 3.2.1-48 | C |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | C |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.A-28<br>(E-12) | 3.2.1-48 | C |

| **Table 3.3.2-19-43-IP3: Pressurizer System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | C |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.C-4<br>(E-33) | 3.2.1-3 | C, 314 |

# Table 3.3.2-19-44-IP3
# Reactor Coolant System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-44-IP3: Reactor Coolant System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | C |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | IV.E-2<br>(RP-04) | 3.3.1-86 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.A-25<br>(EP-46) | 3.2.1-16 | D, 316 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.A-28<br>(E-12) | 3.2.1-48 | C |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | C |

**Table 3.3.2-19-44-IP3: Reactor Coolant System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.A-25<br>(EP-46) | 3.2.1-16 | D, 316 |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.3.1-58 | A |
| Sight glass | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.A-25<br>(EP-46) | 3.2.1-16 | D, 316 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | V.F-6<br>(EP-15) | 3.2.1-52 | C |
| Sight glass | Pressure boundary | Glass | Lube oil (int) | None | None | V.F-7<br>(EP-16) | 3.2.1-52 | C |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.3.1-58 | A |
| Thermowell | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.A-25<br>(EP-46) | 3.2.1-16 | D, 316 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |

| **Table 3.3.2-19-44-IP3: Reactor Coolant System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.A-28<br>(E-12) | 3.2.1-48 | C |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | C |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | IV.C2-9<br>(R-17) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | V.A-25<br>(EP-46) | 3.2.1-16 | D, 316 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | V.A-28<br>(E-12) | 3.2.1-48 | C |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | V.D1-27<br>(E-13) | 3.2.1-1 | C |

**Table 3.3.2-19-44-IP3: Reactor Coolant System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27<br>(EP-41) | 3.2.1-49 | C |

# Table 3.3.2-19-45-IP3
# Reheat Steam System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-45-IP3: Reheat Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-4<br>(S-34) | 3.4.1-22 | I, 310 |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Flow element | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Flow element | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-4<br>(S-06) | 3.4.1-2 | A, 314 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-4<br>(S-06) | 3.4.1-2 | C, 314 |

| **Table 3.3.2-19-45-IP3: Reheat Steam System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7 (S-29) | 3.4.1-28 | I, 310 |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10 (S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.C-5 (S-15) | 3.4.1-29 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-4 (S-06) | 3.4.1-2 | A, 314 |
| Steam trap | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7 (S-29) | 3.4.1-28 | I, 310 |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10 (S-08) | 3.4.1-1 | C |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.C-5 (S-15) | 3.4.1-29 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-4 (S-06) | 3.4.1-2 | A, 314 |
| Strainer Housing | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7 (S-29) | 3.4.1-28 | I, 310 |

**Table 3.3.2-19-45-IP3: Reheat Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Strainer Housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Strainer Housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-4<br>(S-06) | 3.4.1-2 | A, 314 |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Thermowell | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Thermowell | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-4<br>(S-06) | 3.4.1-2 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |

| Table 3.3.2-19-45-IP3: Reheat Steam System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 310 |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.C-5<br>(S-15) | 3.4.1-29 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.C-4<br>(S-06) | 3.4.1-2 | A, 314 |

# Table 3.3.2-19-46-IP3
# Reactor Vessel Level Indication System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-46-IP3: Reactor Vessel Level Indication System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | C |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.E1-17<br>(AP-79) | 3.3.1-91 | C |

# Table 3.3.2-19-47-IP3
# River Water Service System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-47-IP3: River Water Service System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | Bolting Integrity | VII.D-1<br>(A-103) | 3.3.1-44 | C |
| Bolting | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Piping | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Thermowell | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Thermowell | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |
| Valve body | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |

**Table 3.3.2-19-47-IP3: River Water Service System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.C1-19<br>(A-38) | 3.3.1-76 | E |

# Table 3.3.2-19-48-IP3
# Station Air System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-48-IP3: Station Air System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Compressor housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |
| Compressor housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | D |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | D |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.D-3<br>(A-80) | 3.3.1-57 | A |

**Table 3.3.2-19-48-IP3: Station Air System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | VII.D-2<br>(A-26) | 3.3.1-53 | E |

# Table 3.3.2-19-49-IP3
# Spent Fuel Pit and Cooling System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-49-IP3: Spent Fuel Pit and Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | VII.I-2<br>(A-102) | 3.3.1-89 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | C |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |
| Flow element | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20<br>(AP-82) | 3.3.1-90 | C |
| Flow element | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8<br>(AP-79) | 3.3.1-91 | A |
| Filter housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16<br>(AP-18) | 3.3.1-99 | A |

**Table 3.3.2-19-49-IP3: Spent Fuel Pit and Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Filter housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |
| Filter housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8 (AP-79) | 3.3.1-91 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |
| Piping | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8 (AP-79) | 3.3.1-91 | A |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8 (AP-79) | 3.3.1-91 | A |

| **Table 3.3.2-19-49-IP3: Spent Fuel Pit and Cooling System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Strainer housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Strainer housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |
| Strainer housing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8 (AP-79) | 3.3.1-91 | A |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Tank | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |
| Tank | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.A-27 (EP-41) | 3.2.1-49 | C |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Thermowell | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |

**Table 3.3.2-19-49-IP3: Spent Fuel Pit and Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8 (AP-79) | 3.3.1-91 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |
| Tubing | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8 (AP-79) | 3.3.1-91 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-16 (AP-18) | 3.3.1-99 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VII.E1-20 (AP-82) | 3.3.1-90 | C |
| Valve body | Pressure boundary | Stainless steel | Treated borated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A3-8 (AP-79) | 3.3.1-91 | A |

# Table 3.3.2-19-50-IP3
# Steam Generator Blowdown System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-50-IP3: Steam Generator Blowdown System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Eductor | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Eductor | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25<br>(S-10) | 3.4.1-4 | A, 314 |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Filter housing | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Filter housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25<br>(S-10) | 3.4.1-4 | A, 314 |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |

| **Table 3.3.2-19-50-IP3:  Steam Generator Blowdown System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Flow element | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25<br>(S-10) | 3.4.1-4 | A, 314 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-28<br>(S-19) | 3.4.1-3 | A, 314 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.F-26<br>(S-16) | 3.4.1-29 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25<br>(S-10) | 3.4.1-4 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |

**Table 3.3.2-19-50-IP3: Steam Generator Blowdown System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-24 (SP-17) | 3.4.1-14 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C, 302 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-23 (SP-16) | 3.4.1-16 | A, 314 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7 (S-29) | 3.4.1-28 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25 (S-10) | 3.4.1-4 | A, 314 |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7 (S-29) | 3.4.1-28 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25 (S-10) | 3.4.1-4 | A, 314 |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7 (S-29) | 3.4.1-28 | A |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10 (S-08) | 3.4.1-1 | C |

**Table 3.3.2-19-50-IP3: Steam Generator Blowdown System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25<br>(S-10) | 3.4.1-4 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-24<br>(SP-17) | 3.4.1-14 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-23<br>(SP-16) | 3.4.1-16 | A, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.F-26<br>(S-16) | 3.4.1-29 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25<br>(S-10) | 3.4.1-4 | A, 314 |

| Table 3.3.2-19-50-IP3: Steam Generator Blowdown System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-24<br>(SP-17) | 3.4.1-14 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-23<br>(SP-16) | 3.4.1-16 | A, 314 |

# Table 3.3.2-19-51-IP3
# Steam Generator Blowdown Recovery System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-51-IP3: Steam Generator Blowdown Recovery System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Flow element | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-24<br>(SP-17) | 3.4.1-14 | A, 314 |
| Flow element | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Flow element | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-23<br>(SP-16) | 3.4.1-16 | A, 314 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |

**Table 3.3.2-19-51-IP3: Steam Generator Blowdown Recovery System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.F-26<br>(S-16) | 3.4.1-29 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25<br>(S-10) | 3.4.1-4 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-24<br>(SP-17) | 3.4.1-14 | A, 314 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-23<br>(SP-16) | 3.4.1-16 | A, 314 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25<br>(S-10) | 3.4.1-4 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |

**Table 3.3.2-19-51-IP3: Steam Generator Blowdown Recovery System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-24<br>(SP-17) | 3.4.1-14 | A, 314 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-23<br>(SP-16) | 3.4.1-16 | A, 314 |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | CASS | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-24<br>(SP-17) | 3.4.1-14 | A, 314 |
| Valve body | Pressure boundary | CASS | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-23<br>(SP-16) | 3.4.1-16 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-24<br>(SP-17) | 3.4.1-14 | A, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |

**Table 3.3.2-19-51-IP3: Steam Generator Blowdown Recovery System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-23<br>(SP-16) | 3.4.1-16 | A, 314 |

# Table 3.3.2-19-52-IP3
# Steam Generator Sampling System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-52-IP3: Steam Generator Sampling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

| Table 3.3.2-19-52-IP3: Steam Generator Sampling System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |

**Table 3.3.2-19-52-IP3: Steam Generator Sampling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |

**Table 3.3.2-19-52-IP3: Steam Generator Sampling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |

## Table 3.3.2-19-53-IP3
## Safety Injection / Recirculation System
## Nonsafety-Related Components Potentially Affecting Safety Functions
## Summary of Aging Management Review

**Table 3.3.2-19-53-IP3: Safety Injection / Recirculation System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | A |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Boric Acid Corrosion Prevention | V.E-2<br>(E-41) | 3.2.1-45 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-13<br>(EP-19) | 3.2.1-57 | C |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Piping | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Pump casing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Pump casing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Strainer housing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |

**Table 3.3.2-19-53-IP3: Safety Injection / Recirculation System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Strainer housing | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | A |
| Valve body | Pressure boundary | Stainless steel | Treated borated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | V.D1-30<br>(EP-41) | 3.2.1-49 | A |

# Table 3.3.2-19-54-IP3
# Main Generator Seal Oil System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-54-IP3: Main Generator Seal Oil System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.H2-5<br>(AP-39) | 3.3.1-21 | D, 316 |
| Orifice | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Orifice | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |

| Table 3.3.2-19-54-IP3: Main Generator Seal Oil System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Sight glass | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Lube oil (int) | None | None | VII.J-10<br>(AP-15) | 3.3.1-93 | A |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |

| Table 3.3.2-19-54-IP3: Main Generator Seal Oil System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Tubing | Pressure boundary | Copper alloy | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-8<br>(AP-47) | 3.3.1-26 | D, 316 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VII.C1-17<br>(AP-30) | 3.3.1-14 | D, 316 |

# Table 3.3.2-19-55-IP3
# Secondary Plant Sampling System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-55-IP3: Secondary Plant Sampling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 305 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |

**Table 3.3.2-19-55-IP3: Secondary Plant Sampling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |

**Table 3.3.2-19-55-IP3: Secondary Plant Sampling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-11<br>(S-10) | 3.4.1-4 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-5<br>(SP-17) | 3.4.1-14 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 302 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-4<br>(SP-16) | 3.4.1-16 | C, 314 |

# Table 3.3.2-19-56-IP3
# Service Water System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-56-IP3: Service Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | Bolting Integrity | VII.D-1<br>(A-103) | 3.3.1-44 | C |
| Bolting | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | Bolting Integrity | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Filter housing | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Filter housing | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Flow element | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Flow element | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Piping | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |

**Table 3.3.2-19-56-IP3: Service Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Piping | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Tank | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A38) | 3.3.1-76 | A |
| Thermowell | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Thermowell | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |
| Valve body | Pressure boundary | Aluminum | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-14<br>(AP-74) | 3.3.1-27 | E |
| Valve body | Pressure boundary | Aluminum | Raw water (int) | Loss of material | Service Water Integrity | VII.G-8<br>(AP-83) | 3.3.1-62 | E |
| Valve body | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.I-11<br>(A-81) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-19<br>(A-38) | 3.3.1-76 | A |

**Table 3.3.2-19-56-IP3: Service Water System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | CASS | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Valve body | Pressure boundary | CASS | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-16<br>(A-46) | 3.3.1-25 | E |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Raw water (int) | Loss of material | Selective Leaching | VII.C1-10<br>(A-47) | 3.3.1-84 | A |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-9<br>(A-44) | 3.3.1-81 | A |
| Valve body | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | External Surfaces Monitoring | VII.F1-1<br>(A-09) | 3.3.1-27 | E |
| Valve body | Pressure boundary | Stainless steel | Raw water (int) | Loss of material | Service Water Integrity | VII.C1-15<br>(A-54) | 3.3.1-79 | A |

# Table 3.3.2-19-57-IP3
# Turbine Generator Hydraulic Control System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-57-IP3: Turbine Generator Hydraulic Control System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Orifice | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Orifice | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-14<br>(SP-25) | 3.4.1-7 | D, 316 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-14<br>(SP-25) | 3.4.1-7 | D, 316 |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |

| **Table 3.3.2-19-57-IP3: Turbine Generator Hydraulic Control System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Tank | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-14<br>(SP-25) | 3.4.1-7 | D, 316 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-9<br>(SP-38) | 3.4.1-19 | D, 316 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-14<br>(SP-25) | 3.4.1-7 | D, 316 |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 314 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.A-9<br>(SP-38) | 3.4.1-19 | D, 316 |

# Table 3.3.2-19-58-IP3
# Turbine Hall Closed Cooling System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-58-IP3: Turbine Hall Closed Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Flex joint | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Flex joint | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Orifice | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Orifice | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

**Table 3.3.2-19-58-IP3: Turbine Hall Closed Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-1<br>(A-63) | 3.3.1-48 | B |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Piping | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Piping | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-4<br>(AP-12) | 3.3.1-51 | B |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |

| Table 3.3.2-19-58-IP3: Turbine Hall Closed Cooling System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Sight glass | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Sight glass | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VII.J-8<br>(AP-14) | 3.3.1-93 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VII.J-11<br>(AP-50) | 3.3.1-93 | A |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Tank | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |

| **Table 3.3.2-19-58-IP3: Turbine Hall Closed Cooling System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-14<br>(A-25) | 3.3.1-47 | B |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | CASS | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |
| Valve body | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-4<br>(AP-12) | 3.3.1-51 | B |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Air – indoor (ext) | None | None | V.F-3<br>(EP-10) | 3.2.1-53 | C |
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Selective Leaching | VII.C2-6<br>(AP-43) | 3.3.1-84 | A |

**Table 3.3.2-19-58-IP3: Turbine Hall Closed Cooling System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Copper alloy > 15% Zn | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-4<br>(AP-12) | 3.3.1-51 | B |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Closed Cooling Water | VII.C2-10<br>(A-52) | 3.3.1-50 | B |

## Table 3.3.2-19-59-IP3
## Vapor Containment Hydrogen Analyzer System
## Nonsafety-Related Components Potentially Affecting Safety Functions
## Summary of Aging Management Review

**Table 3.3.2-19-59-IP3: Vapor Containment Hydrogen Analyzer System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4 (AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | C |
| Gas analyzer | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Gas analyzer | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |
| Tank | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15 (AP-17) | 3.3.1-94 | A |
| Tank | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |

| **Table 3.3.2-19-59-IP3: Vapor Containment Hydrogen Analyzer System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | A |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (int) | None | None | -- | -- | G |

# Table 3.3.2-19-60-IP3
# Vapor Containment Purge and Supply System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-60-IP3: Vapor Containment Purge and Supply System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-2<br>(A-10) | 3.3.1-56 | A |
| Damper housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Duct | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-2<br>(A-10) | 3.3.1-56 | A |
| Duct | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-2<br>(A-10) | 3.3.1-56 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |

| **Table 3.3.2-19-60-IP3: Vapor Containment Purge and Supply System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-2<br>(A-10) | 3.3.1-56 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |

# Table 3.3.2-19-61-IP3
# Vapor Containment Pressure Relief System
# Nonsafety-Related Components Potentially Affecting Safety Functions
# Summary of Aging Management Review

**Table 3.3.2-19-61-IP3: Vapor Containment Pressure Relief System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VII.I-4<br>(AP-27) | 3.3.1-43 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VII.J-15<br>(AP-17) | 3.3.1-94 | C |
| Duct | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-2<br>(A-10) | 3.3.1-56 | A |
| Duct | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.F3-2<br>(A-10) | 3.3.1-56 | A |
| Filter housing | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VII.I-8<br>(A-77) | 3.3.1-58 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.B-1<br>(E-25) | 3.2.1-32 | E |

## Table 3.3.2-19-62-IP3
## Weld Channel and Containment Penetration Pressurization System
## Nonsafety-Related Components Potentially Affecting Safety Functions
## Summary of Aging Management Review

**Table 3.3.2-19-62-IP3: Weld Channel and Containment Penetration Pressurization System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | V.E-4<br>(EP-25) | 3.2.1-23 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | V.F-12<br>(EP-18) | 3.2.1-53 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Piping | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | C, 301 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | V.E-7<br>(E-44) | 3.2.1-31 | A |
| Valve body | Pressure boundary | Carbon steel | Air – treated (int) | None | None | VII.J-22<br>(AP-4) | 3.3.1-98 | C, 301 |

## 3.4 STEAM AND POWER CONVERSION SYSTEMS

### 3.4.1 Introduction

This section provides the results of the aging management reviews for components in the steam and power conversion systems that are subject to aging management review. The following systems are addressed in this section (the system description is available in the referenced section).

- Main Steam (Section 2.3.4.1)
- Main Feedwater (Section 2.3.4.2)
- Auxiliary Feedwater (Section 2.3.4.3)
- Steam Generator Blowdown (Section 2.3.4.4)
- IP2 AFW Pump Room Fire Event (Section 2.3.4.5)
- Condensate (Section 2.3.4.6)

Table 3.4.1, Summary of Aging Management Programs for Steam and Power Conversion System Evaluated in Chapter VIII of NUREG-1801, provides the summary of the programs evaluated in NUREG-1801 for the steam and power conversion system component group. This table uses the format described in the introduction to Section 3. Hyperlinks are provided to the program evaluations in Appendix B.

### 3.4.2 Results

The following system tables summarize the results of aging management reviews and the NUREG-1801 comparison for the condensate storage system.

- Table 3.4.2-1-IP2 Main Steam System—Summary of Aging Management Review
- Table 3.4.2-1-IP3 Main Steam System—Summary of Aging Management Review
- Table 3.4.2-2-IP2 Main Feedwater System—Summary of Aging Management Review
- Table 3.4.2-2-IP3 Main Feedwater System—Summary of Aging Management Review
- Table 3.4.2-3-IP2 Auxiliary Feedwater System—Summary of Aging Management Review
- Table 3.4.2-3-IP3 Auxiliary Feedwater System—Summary of Aging Management Review
- Table 3.4.2-4-IP2 Steam Generator Blowdown System—Summary of Aging Management Review
- Table 3.4.2-4-IP3 Steam Generator Blowdown System—Summary of Aging Management Review

- IP2 AFW Pump Room Fire Event

  Aging management of the systems required to supply feedwater to the steam generators during a fire in the AFW pump room is not based on an analysis of materials, environments and aging effects. The components in the systems required to supply feedwater to the steam generators during the short duration of the fire event are in service at the time the event occurs or their availability is checked daily. Therefore, integrity of the systems and components required to perform post-fire intended functions for at least one hour is continuously confirmed by normal plant operation. During the event these systems and components must continue to perform their intended functions to supply feedwater to the steam generators for a minimum of one hour. Significant degradation that could threaten the performance of the intended functions will be apparent in the period immediately preceding the event and corrective action will be required to sustain continued operation. For the minimal one hour period that these systems would be required to provide make up to the steam generators, further aging degradation that would not have been apparent prior to the event is negligible. Therefore, no aging effects are identified, and no Summary of Aging Management Review table is provided.

  The IP1 condensate storage tanks are only subject to intermittent service. Therefore, a daily check of tank level and intermittent usage of piping and valves from the IP1 CSTs to the IP2 condenser confirm availability. Significant degradation that could threaten the performance of the intended functions will be apparent in the period immediately preceding the event and corrective action will be required to sustain continued operation.

  The use of this approach for confirmation of the integrity of systems required to perform the post-fire intended function of supplying water to the steam generators is analogous to the approach used for confirmation of condenser integrity in the MSIV leakage pathway of boiling water reactors. In this MSIV leakage pathway scenario, the intended function of the condenser (holdup and plateout of MSIV leakage) is continuously confirmed by normal plant operation. The use of this approach has been accepted by the staff (NUREG-1796, Dresden and Quad Cities SER, Section 3.4.2.4.4, and NUREG-1769, Peach Bottom SER, Section 3.4.2.3), where they concluded that main condenser integrity is continually verified during normal plant operation and no aging management program is required to assure the post-accident intended function.

- Condensate

  Because condensate system components subject to aging management review are evaluated with other systems, including miscellaneous systems in scope for (a)(2), there are no tables associated specifically with the condensate system. See Section 2.3.4.6 for further information.

### 3.4.2.1 Materials, Environment, Aging Effects Requiring Management and Aging Management Programs

The following sections list the materials, environments, aging effects requiring management, and aging management programs for the steam and power conversion systems. Programs are described in Appendix B. Further details are provided in the system tables.

#### 3.4.2.1.1 Main Steam

**Materials**

Main steam system components are constructed of the following materials.

- carbon steel
- stainless steel

**Environment**

Main steam system components are exposed to the following environments.

- air – indoor
- air – outdoor
- steam

**Aging Effects Requiring Management**

The following aging effects associated with the main steam system require management.

- cracking
- cracking – fatigue
- loss of material

**Aging Management Programs**

The following aging management programs manage the aging effects for the main steam system components.

- External Surfaces Monitoring
- Flow-Accelerated Corrosion
- Water Chemistry Control – Primary and Secondary

### 3.4.2.1.2 Main Feedwater

**Materials**

Main feedwater system components are constructed of the following materials.

- carbon steel
- stainless steel

**Environment**

Main feedwater system components are exposed to the following environments.

- air – indoor
- treated water
- treated water > 140°F

**Aging Effects Requiring Management**

The following aging effects associated with the main feedwater system require management.

- cracking
- cracking – fatigue
- loss of material

**Aging Management Programs**

The following aging management programs manage the aging effects for the main feedwater system components.

- Flow-Accelerated Corrosion
- Water Chemistry Control – Primary and Secondary

### 3.4.2.1.3 Auxiliary Feedwater

**Materials**

Auxiliary feedwater system components are constructed of the following materials.

- aluminum
- carbon steel
- copper alloy
- glass
- stainless steel

### Environment

Auxiliary feedwater system components are exposed to the following environments.

- air – indoor
- air – outdoor
- concrete and oiled sand
- condensation
- gas
- lube oil
- soil
- steam
- treated water

### Aging Effects Requiring Management

The following aging effects associated with the auxiliary feedwater system require management.

- cracking
- cracking – fatigue
- fouling
- loss of material

### Aging Management Programs

The following aging management programs manage the aging effects for the auxiliary feedwater system components.

- Aboveground Steel Tanks
- Bolting Integrity
- Buried Piping and Tanks Inspection
- External Surfaces Monitoring
- Flow-Accelerated Corrosion
- Oil Analysis
- One-Time Inspection
- Periodic Surveillance and Preventive Maintenance
- Water Chemistry Control – Primary and Secondary

### 3.4.2.1.4 Steam Generator Blowdown

#### Materials

Steam generator blowdown system components are constructed of the following materials.

- carbon steel
- cast austenitic stainless steel (CASS)
- stainless steel

#### Environment

Steam generator blowdown system components are exposed to the following environments.

- air – indoor
- treated water
- treated water > 140°F

#### Aging Effects Requiring Management

The following aging effects associated with the steam generator blowdown system require management.

- cracking
- cracking – fatigue
- loss of material

#### Aging Management Programs

The following aging management programs manage the aging effects for the steam generator blowdown system components.

- Flow-Accelerated Corrosion
- Water Chemistry Control – Primary and Secondary

### 3.4.2.2 Further Evaluation of Aging Management as Recommended by NUREG-1801

NUREG-1801 indicates that further evaluation is necessary for certain aging effects and other issues discussed in Section 3.4.2.2 of NUREG-1800. The following sections are numbered in accordance with the discussions in NUREG-1800 and explain the approach to those areas requiring further evaluation. Programs are described in Appendix B.

#### 3.4.2.2.1 Cumulative Fatigue Damage

Where identified as an aging effect requiring management, the analysis of fatigue is a TLAA as defined in 10 CFR 54.3. TLAAs are evaluated in accordance with 10 CFR 54.21(c). Evaluation of this TLAA is addressed in Section 4.3.

#### 3.4.2.2.2 Loss of Material Due to General, Pitting, and Crevice Corrosion

1. Loss of material due to general, pitting and crevice corrosion for carbon steel piping and piping components, heat exchanger components and tanks exposed to treated water and for carbon steel piping and components exposed to steam is an aging effect requiring management in the steam and power conversion and other systems at IPEC, which is managed by the Water Chemistry Control – Primary and Secondary Program. The effectiveness of the Water Chemistry Control – Primary and Secondary Program will be confirmed by the One-Time Inspection Program through an inspection of a representative sample of components crediting this program including susceptible locations such as areas of stagnant flow.

   This item is also compared to carbon steel components exposed to steam in the auxiliary systems. For steel auxiliary systems components exposed to steam from systems with controlled water chemistry such as the house service boiler system, the Water Chemistry Control – Auxiliary Systems Program manages loss of material. The One-Time Inspection Program for Water Chemistry will use visual inspections or non-destructive examinations of representative samples to verify that the Water Chemistry Control – Auxiliary Systems have been effective at managing aging effects.

2. Loss of material due to general, pitting and crevice corrosion in steel piping and components exposed to lubricating oil is managed by the Oil Analysis Program, which includes periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. The One-Time Inspection Program will use visual inspections or non-destructive examinations of representative samples to confirm that the Oil Analysis Program has been effective at managing aging effects for components that credit this program.

#### 3.4.2.2.3 Loss of Material due to General, Pitting, Crevice, and Microbiologically-Influenced Corrosion (MIC), and Fouling

Loss of material due to general, pitting, crevice, and MIC, and fouling in steel piping and components in the steam and power conversion systems exposed to raw water is managed by the Periodic Surveillance and Preventive Maintenance Program. The program includes visual inspections and other NDE techniques to manage loss of material of the components. These inspections will manage the aging effect of loss of material such that the intended function of the components will not be affected.

#### 3.4.2.2.4 Reduction of Heat Transfer due to Fouling

1. Reduction of heat transfer due to fouling could occur for stainless steel and copper alloy heat exchanger tubes exposed to treated water. Reduction of heat transfer for copper alloy heat exchanger tubes exposed to treated water is managed by the Water Chemistry Control – Primary and Secondary Program. The effectiveness of the Water Chemistry Control – Primary and Secondary Program will be confirmed by the One-Time Inspection Program through an inspection of a representative sample of components crediting this program including susceptible locations such as areas of stagnant flow. The steam and power conversion systems at IPEC have no stainless steel heat exchanger tubes with intended functions exposed to treated water.

2. Reduction of heat transfer due to fouling for copper alloy heat exchanger tubes exposed to lubricating oil in steam and power conversion systems is managed by the Oil Analysis Program. There are no stainless steel or steel heat exchanger tubes with a heat transfer intended function exposed to lubricating oil in the steam and power conversion systems. This program includes periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to fouling. The One-Time Inspection Program will use visual inspections or non-destructive examinations of representative samples to confirm that the Oil Analysis Program has been effective at managing aging effects for components that credit this program.

#### 3.4.2.2.5 Loss of Material due to General, Pitting, Crevice, and Microbiologically-Influenced Corrosion

1. Loss of material due to general, pitting, crevice, and MIC for carbon steel (with or without coating or wrapping) piping and components buried in soil in the steam and power conversion systems at IPEC is managed by the Buried Piping and Tanks Inspection Program. This program will include (a) preventive measures to mitigate corrosion and (b) inspections to manage the effects of corrosion on the pressure-retaining capability of buried carbon steel components. Buried

components will be inspected when excavated during maintenance. An inspection will be performed within ten years of entering the period of extended operation and within ten years after entering the period of extended operation, unless an opportunistic inspection occurred within these ten-year periods. This program will manage the aging effect of loss of material such that the intended function of the components will not be affected.

2. Loss of material due to general, pitting, crevice corrosion and MIC for carbon steel heat exchanger components exposed to lubricating oil is an aging effect requiring management in the steam and power conversion systems at IPEC and is managed by the Oil Analysis Program. This program includes periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. The One-Time Inspection Program will use visual inspections or non-destructive examinations of representative samples to confirm that the Oil Analysis Program has been effective at managing aging effects for components that credit this program.

### 3.4.2.2.6 Cracking due to Stress Corrosion Cracking (SCC)

Cracking due to SCC in stainless steel components exposed to steam or treated water is managed by the Water Chemistry Control – Primary and Secondary Program. The effectiveness of the Water Chemistry Control – Primary and Secondary Program will be confirmed by the One-Time Inspection Program through an inspection of a representative sample of components crediting this program including susceptible locations such as areas of stagnant flow.

### 3.4.2.2.7 Loss of Material due to Pitting and Crevice Corrosion

1. Loss of material due to pitting and crevice corrosion for stainless steel and copper alloy components exposed to treated water is managed by the Water Chemistry Control – Primary and Secondary Program. The steam and power conversion systems at IPEC have no aluminum components with intended functions that are exposed to treated water. The effectiveness of the Water Chemistry Control – Primary and Secondary Program will be confirmed by the One-Time Inspection Program through an inspection of a representative sample of components crediting this program including susceptible locations such as areas of stagnant flow.

2. Loss of material due to pitting and crevice corrosion could occur for stainless steel piping, piping components, and piping elements exposed to soil. There are no stainless steel components exposed to soil in the steam and power conversion systems. Therefore, this item is not applicable to IPEC.

3. Loss of material due to pitting and crevice corrosion for copper alloy piping and components exposed to lubricating oil is managed by the Oil Analysis Program, which includes periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. The One-Time Inspection Program will use visual inspections or non-destructive examinations of representative samples to confirm that the Oil Analysis Program has been effective at managing aging effects for components that credit this program.

#### 3.4.2.2.8 Loss of Material due to Pitting, Crevice, and Microbiologically-Influenced Corrosion

Loss of material due to pitting, crevice, and MIC in stainless steel piping and components exposed to lubricating oil is managed by the Oil Analysis Program, which includes periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. The One-Time Inspection Program will use visual inspections or non-destructive examinations of representative samples to confirm that the Oil Analysis Program has been effective at managing aging effects for components that credit this program.

#### 3.4.2.2.9 Loss of Material due to General, Pitting, Crevice, and Galvanic Corrosion

Loss of material due to general, pitting, crevice, and galvanic corrosion can occur for steel heat exchanger components exposed to treated water. This item corresponds to a NUREG-1801 line applicable only to BWRs As described in 3.4.2.2.2 item 1, loss of material for steel heat exchanger components exposed to treated water is managed by the Water Chemistry Control – Primary and Secondary Program. The effectiveness of the Water Chemistry Control – Primary and Secondary Program will be confirmed by the One-Time Inspection Program through an inspection of a representative sample of components crediting this program including susceptible locations such as areas of stagnant flow.

#### 3.4.2.2.10 Quality Assurance for Aging Management of Nonsafety-Related Components

See Appendix B Section B.0.3 for discussion of IPEC quality assurance procedures and administrative controls for aging management programs.

### 3.4.2.3 Time-Limited Aging Analysis

The only time-limited aging analysis identified for the steam and power conversion systems components is metal fatigue. This is evaluated in Section 4.3.

### 3.4.3 Conclusion

The steam and power conversion system components that are subject to aging management review have been identified in accordance with the requirements of 10 CFR 54.21. The aging management programs selected to manage the effects of aging on steam and power conversion system components are identified in Section 3.4.2.1 and in the following tables. A description of these aging management programs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation.

Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the steam and power conversion system components will be managed such that there is reasonable assurance that the intended functions will be maintained consistent with the current licensing basis during the period of extended operation.

## Table 3.4.1
## Summary of Aging Management Programs for the Steam and Power Conversion System Evaluated in Chapter VIII of NUREG-1801

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-1 | Steel piping, piping components, and piping elements exposed to steam or treated water | Cumulative fatigue damage | TLAA, evaluated in accordance with 10 CFR 54.21(c) | Yes, TLAA | Fatigue is a TLAA.<br>See Section 3.4.2.2.1. |
| 3.4.1-2 | Steel piping, piping components, and piping elements exposed to steam | Loss of material due to general, pitting and crevice corrosion | Water Chemistry and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Consistent with NUREG-1801 for steam and power conversion system components. Loss of material in steel components exposed to steam is managed by the Water Chemistry Control – Primary and Secondary Program. The One-Time Inspection Program will be used to verify the effectiveness of the water chemistry program. For some auxiliary systems components, loss of material is managed by the Water Chemistry Control – Auxiliary Systems Program.<br>See Section 3.4.2.2.2 item 1. |

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-3 | Steel heat exchanger components exposed to treated water | Loss of material due to general, pitting and crevice corrosion | Water Chemistry and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Consistent with NUREG-1801. Loss of material in steel heat exchanger components exposed to treated water is managed by the Water Chemistry Control – Primary and Secondary Program. The One-Time Inspection Program will be used to verify the effectiveness of the water chemistry program. The component to which this NUREG-1801 line item applies is included in scope under criterion 10 CFR 54.4(a)(2) and listed in the series 3.3.2-19-xx tables.<br>See Section 3.4.2.2.2 item 1. |
| 3.4.1-4 | Steel piping, piping components, and piping elements exposed to treated water | Loss of material due to general, pitting and crevice corrosion | Water Chemistry and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Consistent with NUREG-1801. Loss of material in steel components exposed to treated water is managed by the Water Chemistry Control – Primary and Secondary Program. The One-Time Inspection Program will be used to verify the effectiveness of the water chemistry program.<br>See Section 3.4.2.2.2 item 1. |
| 3.4.1-5 | BWR only | | | | |

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-6 | Steel and stainless steel tanks exposed to treated water | Loss of material due to general (steel only) pitting and crevice corrosion | Water Chemistry and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Consistent with NUREG-1801. Loss of material in steel and stainless steel tanks exposed to treated water is managed by the Water Chemistry Control – Primary and Secondary Program. The One-Time Inspection Program will be used to verify the effectiveness of the water chemistry program.<br>See Section Section 3.4.2.2.2 item 1 and Section Section 3.4.2.2.7 item 1. |
| 3.4.1-7 | Steel piping, piping components, and piping elements exposed to lubricating oil | Loss of material due to general, pitting and crevice corrosion | Lubricating Oil Analysis and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Loss of material in steel components exposed to lubricating oil is managed by the Oil Analysis Program. The One-Time Inspection Program will be used to confirm the effectiveness of the Oil Analysis Program. The components to which this NUREG-1801 line item applies are included in scope under criterion 10 CFR 54.4(a)(2) and listed in series 3.3.2-19-xx tables.<br>See Section 3.4.2.2.2 item 2. |

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-8 | 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 | Plant specific | Yes, plant specific | The Periodic Surveillance and Preventive Maintenance Program manages loss of material in steel components exposed to raw water. The components to which this NUREG-1801 line item applies are included in scope under criterion 10 CFR 54.4(a)(2) and listed in series 3.3.2-19-xx tables.<br>See Section 3.4.2.2.3. |
| 3.4.1-9 | Stainless steel and copper alloy heat exchanger tubes exposed to treated water | Reduction of heat transfer due to fouling | Water Chemistry and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Consistent with NUREG-1801. The reduction of heat transfer in copper alloy heat exchanger tubes exposed to treated water is managed by the Water Chemistry Control – Primary and Secondary Program. The One-Time Inspection Program will be used to verify the effectiveness of the water chemistry program. There are no stainless steel heat exchanger tubes exposed to treated water in the steam and power conversion systems.<br>See Section 3.4.2.2.4 item 1. |

| Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1 | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 3.4.1-10 | Steel, stainless steel, and copper alloy heat exchanger tubes exposed to lubricating oil | Reduction of heat transfer due to fouling | Lubricating Oil Analysis and One-Time Inspection | Yes, detection of aging effects is to be evaluated | The reduction of heat transfer in copper alloy heat exchanger tubes exposed to lubricating oil is managed by the Oil Analysis Program. The One-Time Inspection Program will be used to confirm the effectiveness of the Oil Analysis Program. There are no steel or stainless steel heat exchanger tubes with a heat transfer intended function exposed to lubricating oil in the steam and power conversion systems.<br>See Section 3.4.2.2.4 item 2. |
| 3.4.1-11 | Buried steel piping, piping components, piping elements, and tanks (with or without coating or wrapping) exposed to soil | Loss of material due to general, pitting, crevice, and microbiologically-influenced corrosion | Buried Piping and Tanks Surveillance<br>or<br>Buried Piping and Tanks Inspection | No<br>Yes, detection of aging effects and operating experience are to be further evaluated | Consistent with NUREG-1801. The Buried Piping and Tanks Inspection Program manages loss of material for buried steel components.<br>See Section 3.4.2.2.5 item 1. |

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-12 | Steel heat exchanger components exposed to lubricating oil | Loss of material due to general, pitting, crevice, and microbiologically-influenced corrosion | Lubricating Oil Analysis and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Loss of material in steel heat exchanger components exposed to lubricating oil is managed by the Oil Analysis Program. The One-Time Inspection Program will be used to confirm the effectiveness of the Oil Analysis Program.<br>See Section 3.4.2.2.5 item 2. |
| 3.4.1-13 | BWR only | | | | |
| 3.4.1-14 | Stainless steel piping, piping components, piping elements, tanks, and heat exchanger components exposed to treated water >60°C (>140°F) | Cracking due to stress corrosion cracking | Water Chemistry and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Consistent with NUREG-1801. Cracking in stainless steel components exposed to treated water > 140°F is managed by the Water Chemistry Control – Primary and Secondary Program. The One-Time Inspection Program will be used to verify the effectiveness of the water chemistry program.<br>See Section 3.4.2.2.6. |

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-15 | Aluminum and copper alloy piping, piping components, and piping elements exposed to treated water | Loss of material due to pitting and crevice corrosion | Water Chemistry and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Consistent with NUREG-1801. Loss of material in copper alloy components exposed to treated water is managed by the Water Chemistry Control – Primary and Secondary Program. The One-Time Inspection Program will be used to verify the effectiveness of the water chemistry program. There are no aluminum components exposed to treated water with intended functions in the steam and power conversion systems.<br>See Section 3.4.2.2.7 item 1. |
| 3.4.1-16 | Stainless steel piping, piping components, and piping elements; tanks, and heat exchanger components exposed to treated water | Loss of material due to pitting and crevice corrosion | Water Chemistry and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Consistent with NUREG-1801. Loss of material in stainless steel components exposed to treated water is managed by the Water Chemistry Control – Primary and Secondary Program. The One-Time Inspection Program will be used to verify the effectiveness of the water chemistry program.<br>See Section 3.4.2.2.7 item 1. |

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-17 | Stainless steel piping, piping components, and piping elements exposed to soil | Loss of material due to pitting and crevice corrosion | Plant specific | Yes, plant specific | Not applicable. There are no stainless steel components exposed to soil in the steam and power conversion systems.<br>See Section 3.4.2.2.7 item 2. |
| 3.4.1-18 | Copper alloy piping, piping components, and piping elements exposed to lubricating oil | Loss of material due to pitting and crevice corrosion | Lubricating Oil Analysis and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Loss of material in copper alloy components exposed to lubricating oil is managed by the Oil Analysis Program. The One-Time Inspection Program will be used to confirm the effectiveness of the Oil Analysis Program.<br>See Section 3.4.2.2.7 item 3. |
| 3.4.1-19 | Stainless steel piping, piping components, piping elements, and heat exchanger components exposed to lubricating oil | Loss of material due to pitting, crevice, and microbiologically-influenced corrosion | Lubricating Oil Analysis and One-Time Inspection | Yes, detection of aging effects is to be evaluated | Loss of material in stainless steel components exposed to lubricating oil is managed by the Oil Analysis Program. The One-Time Inspection Program will be used to confirm the effectiveness of the Oil Analysis Program. The components to which this NUREG-1801 line item applies are included in scope under criterion 10 CFR 54.4(a)(2) and listed in series 3.3.2-19-xx tables.<br>See Section 3.4.2.2.8 |

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-20 | Steel tanks exposed to air – outdoor (external) | Loss of material/ general, pitting, and crevice corrosion | Aboveground Steel Tanks | No | Consistent with NUREG-1801. Loss of material in steel tanks exposed to outdoor air is managed by the Aboveground Steel Tanks Program. |
| 3.4.1-21 | High-strength steel closure bolting exposed to air with steam or water leakage | Cracking due to cyclic loading, stress corrosion cracking | Bolting Integrity | No | Not applicable. High-strength steel closure bolting is not used in the steam and power conversion systems. |

| Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1 | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 3.4.1-22 | Steel bolting and closure bolting exposed to air with steam or water leakage, air – outdoor (external), or air – indoor uncontrolled (external); | Loss of material due to general, pitting and crevice corrosion; loss of preload due to thermal effects, gasket creep, and self-loosening | Bolting Integrity | No | Consistent with NUREG-1801 for bolting susceptible to loss of material. The Bolting Integrity Program manages the loss of material for steel bolting. Loss of preload is not an applicable aging effect. Loss of preload is a design-driven effect and not an aging effect requiring management. Bolting at IPEC is standard grade B7 low alloy steel, or similar material, except in rare specialized applications such as where stainless steel bolting is utilized. Loss of preload due to stress relaxation (creep) would only be a concern in very high temperature applications (> 700°F), as stated in the ASME Code, Section II, Part D, Table 4. No IPEC bolting operates at > 700°F. Therefore, loss of preload due to stress relaxation (creep) is not an applicable aging effect for steam and power conversion systems. Other issues such as gasket creep and self loosening that may result in pressure boundary joint leakage are improper design or maintenance issues.<br>(continued) |

| Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1 | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| | | | | | Improper bolting application (design) and maintenance issues are current plant operational concerns and not related to aging effects or mechanisms that require management during the period of extended operation. As described in the Bolting Integrity Program, IPEC has taken actions to address NUREG–1339, *Resolution to Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants*. These actions include implementation of good bolting practices in accordance with EPRI NP-5067, Good Bolting Practices. Proper joint preparation and make-up in accordance with industry standards is expected to preclude loss of preload. This has been confirmed by operating experience at IPEC. |
| 3.4.1-23 | Stainless steel piping, piping components, and piping elements exposed to closed-cycle cooling water >60°C (>140°F) | Cracking due to stress corrosion cracking | Closed-Cycle Cooling Water System | No | Not applicable. There are no stainless steel components exposed to closed cycle cooling water > 140°F in the steam and power conversion systems. |

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-24 | Steel 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 | No | Consistent with NUREG-1801. Loss of material in steel components exposed to closed cycle cooling water is managed by the Water Chemistry Control – Closed Cooling Water Program. These components are included in scope under criterion 10 CFR 54.4(a)(2) and listed in series 3.3.2-19-xx tables. |
| 3.4.1-25 | Stainless steel piping, piping components, piping elements, and heat exchanger components exposed to closed cycle cooling water | Loss of material due to pitting and crevice corrosion | Closed-Cycle Cooling Water System | No | Consistent with NUREG-1801. Loss of material in stainless steel components exposed to closed cycle cooling water is managed by the Water Chemistry Control – Closed Cooling Water Program. These components are included in scope under criterion 10 CFR 54.4(a)(2) and listed in series 3.3.2-19-xx tables. |
| 3.4.1-26 | 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 | No | Consistent with NUREG-1801. Loss of material in copper alloy components exposed to closed cycle cooling water is managed by the Water Chemistry Control – Closed Cooling Water Program. These components are included in scope under criterion 10 CFR 54.4(a)(2) and listed in series 3.3.2-19-xx tables. |

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-27 | 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 | No | Not applicable. There are no heat exchanger tubes with a heat transfer intended function exposed to closed cycle cooling water in the steam and power conversion systems. |
| 3.4.1-28 | Steel external surfaces exposed to air – indoor uncontrolled (external), condensation (external), or air outdoor (external) | Loss of material due to general corrosion | External Surfaces Monitoring | No | Consistent with NUREG-1801 for components susceptible to loss of material. The External Surfaces Monitoring Program manages the loss of material for external surfaces of steel components. |
| 3.4.1-29 | Steel piping, piping components, and piping elements exposed to steam or treated water | Wall thinning due to flow-accelerated corrosion | Flow-Accelerated Corrosion | No | Consistent with NUREG-1801. The Flow-Accelerated Corrosion Program manages loss of material in steel components exposed to steam or treated water. |

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-30 | Steel piping, piping components, and piping elements exposed to air outdoor (internal) or condensation (internal) | Loss of material due to general, pitting, and crevice corrosion | Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components | No | The only steel components with intended functions in the steam and power conversion systems with internal surfaces exposed to outdoor air or condensation are the condensate storage tanks. The tank vapor space is nitrogen blanketed but the environment is conservatively assumed to be condensation. Loss of material for these tank surfaces is managed by controlling the tank water chemistry with the Water Chemistry Control – Primary and Secondary Program. The One-Time Inspection Program will be used to verify the effectiveness of the water chemistry program. |
| 3.4.1-31 | 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 | No | Not applicable. There are no steel heat exchanger components with intended functions exposed to raw water in the steam and power conversion systems. |

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-32 | 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 | No | The Periodic Surveillance and Preventive Maintenance Program uses periodic visual inspections to manage loss of material for copper alloy components exposed to raw water. The One-Time Inspection Program will use visual or other NDE techniques to confirm the absence of significant loss of material for stainless steel components exposed to raw water. The components to which this NUREG-1801 line item applies are included in scope under criterion 10 CFR 54.4(a)(2) and listed in series 3.3.2-19-xx tables for systems other than service water. |
| 3.4.1-33 | Stainless steel heat exchanger components exposed to raw water | Loss of material due to pitting, crevice, and microbiologically-influenced corrosion, and fouling | Open-Cycle Cooling Water System | No | Not applicable. There are no stainless steel heat exchanger components exposed to raw water in the steam and power conversion systems. |

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-34 | Steel, stainless steel, and copper alloy heat exchanger tubes exposed to raw water | Reduction of heat transfer due to fouling | Open-Cycle Cooling Water System | No | Not applicable. There are no heat exchanger tubes exposed to raw water with an intended function of heat transfer in the steam and power conversion systems. |
| 3.4.1-35 | Copper alloy >15% Zn piping, piping components, and piping elements exposed to closed cycle cooling water, raw water, or treated water | Loss of material due to selective leaching | Selective Leaching of Materials | No | Consistent with NUREG-1801. Loss of material in copper alloy > 15% Zinc components is managed by the Selective Leaching Program. The components to which this NUREG-1801 line item applies are in scope under criterion 10 CFR 54.4(a)(2), listed in series 3.3.2-19-xx tables. |
| 3.4.1-36 | Gray cast iron piping, piping components, and piping elements exposed to soil, treated water, or raw water | Loss of material due to selective leaching | Selective Leaching of Materials | No | Not applicable. There are no gray cast iron components exposed to soil, treated water, or raw water with intended functions in the steam and power conversion systems. |

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-37 | Steel, stainless steel, and nickel-based alloy piping, piping components, and piping elements exposed to steam | Loss of material due to pitting and crevice corrosion | Water Chemistry | No | Consistent with NUREG-1801 for steam and power conversion system components. The loss of material in steel and stainless steel components exposed to steam is managed by the Water Chemistry Control – Primary and Secondary Program. There are no nickel alloy components exposed to steam in the steam and power conversion systems. For stainless steel components exposed to steam in systems with controlled water chemistry, such as the house service boiler system, the Water Chemistry Control – Auxiliary Systems Program manages loss of material. The One-Time Inspection Program for Water Chemistry will use inspections or non-destructive examinations of representative samples to verify that the Water Chemistry Control – Auxiliary Systems and Water Chemistry Control – Primary and Secondary Programs have been effective at managing aging effects. |

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-38 | Steel bolting and external surfaces exposed to air with borated water leakage | Loss of material due to boric acid corrosion | Boric Acid Corrosion | No | Not applicable. There are no steel components exposed to air with borated water leakage in the steam and power conversion systems. |
| 3.4.1-39 | Stainless steel piping, piping components, and piping elements exposed to steam | Cracking due to stress corrosion cracking | Water Chemistry | No | Consistent with NUREG-1801 for steam and power conversion system components. Cracking of stainless steel components exposed to steam is managed by the Water Chemistry Control – Primary and Secondary Program. For stainless steel components exposed to steam in systems with controlled water chemistry, such as the house service boiler system, the Water Chemistry Control – Auxiliary Systems Program manages cracking. The One-Time Inspection Program for Water Chemistry will use inspections or non-destructive examinations of representative samples to verify that the Water Chemistry Control – Auxiliary Systems and Water Chemistry Control – Primary and Secondary Programs have been effective at managing aging effects. |

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-40 | Glass piping elements exposed to air, lubricating oil, raw water, and treated water | None | None | NA - No AEM or AMP | Consistent with NUREG-1801. |
| 3.4.1-41 | Stainless steel, copper alloy, and nickel alloy piping, piping components, and piping elements exposed to air – indoor uncontrolled (external) | None | None | NA - No AEM or AMP | Consistent with NUREG-1801. |
| 3.4.1-42 | Steel piping, piping components, and piping elements exposed to air – indoor controlled (external) | None | None | NA - No AEM or AMP | Not applicable. There are no steel components exposed to air – indoor controlled in the steam and power conversion systems. All indoor air environments are conservatively considered to be uncontrolled. |
| 3.4.1-43 | Steel and stainless steel piping, piping components, and piping elements in concrete | None | None | NA - No AEM or AMP | Not applicable. There are no steel or stainless steel components with intended functions embedded in concrete in the steam and power conversion systems. |

**Table 3.4.1: Steam and Power Conversion Systems, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.4.1-44 | Steel, stainless steel, aluminum, and copper alloy piping, piping components, and piping elements exposed to gas | None | None | NA - No AEM or AMP | Consistent with NUREG-1801 for steel, stainless steel and aluminum components exposed to gas. There are no copper alloy components exposed to gas in the steam and power conversion systems. |

## Notes for Tables 3.4.2-1-IP2 through 3.4.2-4-IP3

### Generic Notes

A. Consistent with NUREG-1801 item for component, material, environment, aging effect and aging management program. AMP is consistent with NUREG-1801 AMP.

B. Consistent with NUREG-1801 item for component, material, environment, aging effect and aging management program. AMP has exceptions to NUREG-1801 AMP.

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

D. Component is different, but consistent with NUREG-1801 item for material, environment, aging effect and aging management program. AMP has exceptions to NUREG-1801 AMP.

E. Consistent with NUREG-1801 material, environment, and aging effect but a different aging management program is credited.

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.

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

J. Neither the component nor the material and environment combination is evaluated in NUREG-1801.

### Plant-Specific Notes

401. These components remain at high temperature during normal operation which precludes moisture condensation and the resulting corrosion.

402. This environment is inside the condensate storage tank. The tank vapor space is nitrogen blanketed but the environment is conservatively assumed to be condensation.

403. This treated water environment is controlled by the Water Chemistry Control – Auxiliary Systems Program. Although this environment does not directly compare with any NUREG-1801 defined environment, it approximates the NUREG-1801 defined closed cycle cooling water environment.

404. The One-Time Inspection Program will verify effectiveness of the Water Chemistry Control – Primary and Secondary Program.

405. The One-Time Inspection Program will verify effectiveness of the Oil Analysis Program.

406. This treated water environment is similar or equivalent to secondary coolant. For the purposes of evaluating the aging effect of cracking due to fatigue, this environment may be compared to treated borated water.

407. This treated water environment includes water that has been treated but is not maintained by a chemistry control program, such as water from the city water system. There is no environment in NUREG-1801 that will support a useful comparison for this line.

# Table 3.4.2-1-IP2
# Main Steam System
# Summary of Aging Management Review

**Table 3.4.2-1-IP2: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-4<br>(S-34) | 3.4.1-22 | I, 401 |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 401 |
| Flow element | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Flow element | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | A |
| Flow element | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 401 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(S-29) | 3.2.1-32 | E |

**Table 3.4.2-1-IP2: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-8<br>(S-41) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |
| Silencer | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(S-29) | 3.2.1-32 | E |

**Table 3.4.2-1-IP2: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Silencer | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-8<br>(S-41) | 3.4.1-28 | A |
| Steam trap | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 401 |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(s-15) | 3.4.1-29 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Strainer | Filtration | Stainless steel | Steam (ext) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Strainer | Filtration | Stainless steel | Steam (ext) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | F |
| Strainer | Filtration | Stainless steel | Steam (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |
| Strainer | Filtration | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |

**Table 3.4.2-1-IP2: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Strainer | Filtration | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Strainer | Filtration | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 401 |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | A |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Thermowell | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Thermowell | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |

**Table 3.4.2-1-IP2: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 401 |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |

**Table 3.4.2-1-IP2: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10 (SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2 (SP-44) | 3.4.1-39 | A |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3 (SP-43) | 3.4.1-37 | A |

# Table 3.4.2-1-IP3
# Main Steam System
# Summary of Aging Management Review

| Table 3.4.2-1-IP3: Main Steam System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-4<br>(S-34) | 3.4.1-22 | I, 401 |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Flow element | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 401 |
| Flow element | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Flow element | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | A |
| Flow element | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 401 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(S-29) | 3.2.1-32 | E |

**Table 3.4.2-1-IP3: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-8<br>(S-41) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Piping | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |
| Silencer | Pressure boundary | Carbon steel | Air – indoor (int) | Loss of material | External Surfaces Monitoring | V.A-19<br>(S-29) | 3.2.1-32 | E |

**Table 3.4.2-1-IP3: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Silencer | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-8<br>(S-41) | 3.4.1-28 | A |
| Steam trap | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 401 |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Strainer | Filtration | Stainless steel | Steam (ext) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Strainer | Filtration | Stainless steel | Steam (ext) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | F |
| Strainer | Filtration | Stainless steel | Steam (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |
| Strainer | Filtration | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |

**Table 3.4.2-1-IP3: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Strainer | Filtration | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Strainer | Filtration | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 401 |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | A |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Thermowell | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Thermowell | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |

**Table 3.4.2-1-IP3: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | VIII.H-7<br>(S-29) | 3.4.1-28 | I, 401 |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-8<br>(S-07) | 3.4.1-37 | A |

**Table 3.4.2-1-IP3: Main Steam System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.B1-2<br>(SP-44) | 3.4.1-39 | A |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.B1-3<br>(SP-43) | 3.4.1-37 | A |

## Table 3.4.2-2-IP2
## Main Feedwater System
## Summary of Aging Management Review

**Table 3.4.2-2-IP2: Main Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | -- | -- | I, 401 |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | -- | -- | I, 401 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.D1-7<br>(S-11) | 3.4.1-1 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 404 |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5<br>(SP-17) | 3.4.1-14 | A, 404 |

| **Table 3.4.2-2-IP2: Main Feedwater System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 406 |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4<br>(SP-16) | 3.4.1-16 | A, 404 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5<br>(SP-17) | 3.4.1-14 | A, 404 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 406 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4<br>(SP-16) | 3.4.1-16 | A, 404 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | -- | -- | I, 401 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.D1-7<br>(S-11) | 3.4.1-1 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9<br>(S-16) | 3.4.1-29 | A |

**Table 3.4.2-2-IP2: Main Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 404 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5<br>(SP-17) | 3.4.1-14 | A, 404 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 406 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4<br>(SP-16) | 3.4.1-16 | A, 404 |

# Table 3.4.2-2-IP3
# Main Feedwater System
# Summary of Aging Management Review

**Table 3.4.2-2-IP3: Main Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | -- | -- | I, 401 |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10 (SP-12) | 3.4.1-41 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | -- | -- | I, 401 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.D1-7 (S-11) | 3.4.1-1 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9 (S-16) | 3.4.1-29 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8 (S-10) | 3.4.1-4 | A, 404 |
| Thermowell | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10 (SP-12) | 3.4.1-41 | A |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5 (SP-17) | 3.4.1-14 | A, 404 |

**Table 3.4.2-2-IP3: Main Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C, 406 |
| Thermowell | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4 (SP-16) | 3.4.1-16 | A, 404 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10 (SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5 (SP-17) | 3.4.1-14 | A, 404 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C, 406 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4 (SP-16) | 3.4.1-16 | A, 404 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | -- | -- | I, 401 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.D1-7 (S-11) | 3.4.1-1 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.D1-9 (S-16) | 3.4.1-29 | A |

| Table 3.4.2-2-IP3: Main Feedwater System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-8<br>(S-10) | 3.4.1-4 | A, 404 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.D1-5<br>(SP-17) | 3.4.1-14 | A, 404 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16<br>(A-57) | 3.3.1-2 | C, 406 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.D1-4<br>(SP-16) | 3.4.1-16 | A, 404 |

# Table 3.4.2-3-IP2
# Auxiliary Feedwater System
# Summary of Aging Management Review

**Table 3.4.2-3-IP2: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | VIII.H-1<br>(S-32) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Bolting | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | -- | -- | G |
| Flex hose | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Flex hose | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Flex hose | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Flex hose | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |

**Table 3.4.2-3-IP2:  Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Flow element | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-32<br>(SP-16) | 3.4.1-16 | A, 404 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.G-6<br>(S-17) | 3.4.1-12 | B, 405 |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Lube oil (ext) | Fouling | Oil Analysis | VIII.G-8<br>(SP-53) | 3.4.1-10 | B, 405 |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Treated water (int) | Fouling | Water Chemistry Control – Primary and Secondary | VIII.G-10<br>(SP-58) | 3.4.1-9 | A, 404 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Lube oil (ext) | Loss of material | Oil Analysis | VIII.G-19<br>(SP-32) | 3.4.1-18 | B, 405 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-5<br>(SP-61) | 3.4.1-15 | C, 404 |

| **Table 3.4.2-3-IP2: Auxiliary Feedwater System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Orifice | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Orifice | Pressure boundary<br>Flow control | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-32<br>(SP-16) | 3.4.1-16 | A, 404 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-8<br>(S-41) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | -- | -- | G, 402 |
| Piping | Pressure boundary | Carbon steel | Gas (int) | None | None | VIII.I-15<br>(SP-4) | 3.4.1-44 | A |
| Piping | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VIII.G-1<br>(S-01) | 3.4.1-11 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | C |

| **Table 3.4.2-3-IP2: Auxiliary Feedwater System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 404 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 407 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-38<br>(S-10) | 3.4.1-4 | A, 404 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | -- | -- | G, 402 |
| Piping | Pressure boundary | Stainless steel | Gas (int) | None | None | VIII.I-12<br>(SP-15) | 3.4.1-44 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-32<br>(SP-16) | 3.4.1-16 | A, 404 |

**Table 3.4.2-3-IP2: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-32<br>(SP-16) | 3.4.1-16 | A, 404 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-38<br>(S-10) | 3.4.1-4 | A, 404 |
| Sight glass | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | VIII.I-2<br>(SP-6) | 3.4.1-41 | A |
| Sight glass | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-5<br>(SP-61) | 3.4.1-15 | C, 404 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VIII.I-4<br>(SP-33) | 3.4.1-40 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VIII.I-8<br>(SP-35) | 3.4.1-40 | A |
| Steam trap | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |

**Table 3.4.2-3-IP2: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | C |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 404 |
| Steam trap | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-38<br>(S-10) | 3.4.1-4 | A, 404 |
| Strainer | Filtration | Stainless steel | Steam (ext) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Strainer | Filtration | Stainless steel | Steam (ext) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | F |
| Strainer | Filtration | Stainless steel | Steam (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Strainer | Filtration | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Strainer | Filtration | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Strainer | Filtration | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |

**Table 3.4.2-3-IP2: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | C |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 404 |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-38<br>(S-10) | 3.4.1-4 | A, 404 |
| Tank | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Aboveground Steel Tanks | VIII.G-40<br>(S-31) | 3.4.1-20 | A |
| Tank | Pressure boundary | Carbon steel | Concrete and oiled sand (ext) | Loss of material | Aboveground Steel Tanks | -- | -- | G |
| Tank | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-34<br>(SP-60) | 3.4.1-30 | E, 402 |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-41<br>(S-13) | 3.4.1-6 | A, 404 |

**Table 3.4.2-3-IP2: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-38<br>(S-10) | 3.4.1-4 | A, 404 |
| Tubing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Tubing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Tubing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 404 |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | VIII.I-2<br>(SP-6) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Copper alloy | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |

**Table 3.4.2-3-IP2: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 407 |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-32<br>(SP-16) | 3.4.1-16 | A, 404 |
| Turbine housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Turbine housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 404 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-8<br>(S-41) | 3.4.1-28 | A |

| **Table 3.4.2-3-IP2: Auxiliary Feedwater System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Carbon steel | Gas (int) | None | None | VIII.I-15<br>(SP-4) | 3.4.1-44 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 404 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 407 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-38<br>(S-10) | 3.4.1-4 | A, 404 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Valve body | Pressure boundary | Stainless steel | Gas (int) | None | None | VIII.I-12<br>(SP-15) | 3.4.1-44 | A |

**Table 3.4.2-3-IP2: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 407 |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-32<br>(SP-16) | 3.4.1-16 | A, 404 |
| Valve body | Pressure boundary<br>Flow control | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary<br>Flow control | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary<br>Flow control | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 404 |

**Table 3.4.2-3-IP2: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary<br>Flow control | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-38<br>(S-10) | 3.4.1-4 | A, 404 |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |

# Table 3.4.2-3-IP3
# Auxiliary Feedwater System
# Summary of Aging Management Review

**Table 3.4.2-3-IP3: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | Bolting Integrity | VIII.H-4<br>(S-34) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | VIII.H-1<br>(S-32) | 3.4.1-22 | A |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Bolting | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | Bolting Integrity | -- | -- | G |
| Flex hose | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Flex hose | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Flex hose | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Flex hose | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |

**Table 3.4.2-3-IP3: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Flow element | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Flow element | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-32<br>(SP-16) | 3.4.1-16 | A, 404 |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Heat exchanger (shell) | Pressure boundary | Carbon steel | Lube oil (int) | Loss of material | Oil Analysis | VIII.G-6<br>(S-17) | 3.4.1-12 | B, 405 |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Lube oil (ext) | Fouling | Oil Analysis | VIII.G-8<br>(SP-53) | 3.4.1-10 | B, 405 |
| Heat exchanger (tubes) | Heat transfer | Copper alloy | Treated water (int) | Fouling | Water Chemistry Control – Primary and Secondary | VIII.G-10<br>(SP-58) | 3.4.1-9 | A, 404 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Lube oil (ext) | Loss of material | Oil Analysis | VIII.G-19<br>(SP-32) | 3.4.1-18 | B, 405 |
| Heat exchanger (tubes) | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-5<br>(SP-61) | 3.4.1-15 | C, 404 |

**Table 3.4.2-3-IP3: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Orifice | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Orifice | Pressure boundary<br>Flow control | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-32<br>(SP-16) | 3.4.1-16 | A, 404 |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-8<br>(S-41) | 3.4.1-28 | A |
| Piping | Pressure boundary | Carbon steel | Condensation (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | -- | -- | G, 402 |
| Piping | Pressure boundary | Carbon steel | Gas (int) | None | None | VIII.I-15<br>(SP-4) | 3.4.1-44 | A |
| Piping | Pressure boundary | Carbon steel | Soil (ext) | Loss of material | Buried Piping and Tanks Inspection | VIII.G-1<br>(S-01) | 3.4.1-11 | A |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | C |

| Table 3.4.2-3-IP3: Auxiliary Feedwater System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Piping | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 404 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 407 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-38<br>(S-10) | 3.4.1-4 | A, 404 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Piping | Pressure boundary | Stainless steel | Condensation (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | -- | -- | G, 402 |
| Piping | Pressure boundary | Stainless steel | Gas (int) | None | None | VIII.I-12<br>(SP-15) | 3.4.1-44 | A |
| Piping | Pressure boundary | Stainless steel | Treated water (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-32<br>(SP-16) | 3.4.1-16 | A, 404 |

**Table 3.4.2-3-IP3: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-32<br>(SP-16) | 3.4.1-16 | A, 404 |
| Pump casing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Pump casing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-38<br>(S-10) | 3.4.1-4 | A, 404 |
| Sight glass | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | VIII.I-2<br>(SP-6) | 3.4.1-41 | A |
| Sight glass | Pressure boundary | Copper alloy | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-5<br>(SP-61) | 3.4.1-15 | C, 404 |
| Sight glass | Pressure boundary | Glass | Air – indoor (ext) | None | None | VIII.I-4<br>(SP-33) | 3.4.1-40 | A |
| Sight glass | Pressure boundary | Glass | Treated water (int) | None | None | VIII.I-8<br>(SP-35) | 3.4.1-40 | A |
| Steam trap | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |

| Table 3.4.2-3-IP3: Auxiliary Feedwater System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | C |
| Steam trap | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 404 |
| Steam trap | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-38<br>(S-10) | 3.4.1-4 | A, 404 |
| Strainer | Filtration | Stainless steel | Steam (ext) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Strainer | Filtration | Stainless steel | Steam (ext) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | F |
| Strainer | Filtration | Stainless steel | Steam (ext) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Strainer | Filtration | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Strainer | Filtration | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Strainer | Filtration | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |

**Table 3.4.2-3-IP3: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Strainer housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | C |
| Strainer housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 404 |
| Strainer housing | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-38<br>(S-10) | 3.4.1-4 | A, 404 |
| Tank | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | Aboveground Steel Tanks | VIII.G-40<br>(S-31) | 3.4.1-20 | A |
| Tank | Pressure boundary | Carbon steel | Concrete and oiled sand (ext) | Loss of material | Aboveground Steel Tanks | -- | -- | G |
| Tank | Pressure boundary | Carbon steel | Condensation (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-34<br>(SP-60) | 3.4.1-30 | E, 402 |
| Tank | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-41<br>(S-13) | 3.4.1-6 | A, 404 |

**Table 3.4.2-3-IP3: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Thermowell | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Thermowell | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-38<br>(S-10) | 3.4.1-4 | A, 404 |
| Tubing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Tubing | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Tubing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 404 |
| Tubing | Pressure boundary | Copper alloy | Air – indoor (ext) | None | None | VIII.I-2<br>(SP-6) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Copper alloy | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | -- | -- | G |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |

**Table 3.4.2-3-IP3: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Tubing | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 407 |
| Tubing | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-32<br>(SP-16) | 3.4.1-16 | A, 404 |
| Turbine housing | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Turbine housing | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 404 |
| Valve body | Pressure boundary | Aluminum | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | -- | -- | G |
| Valve body | Pressure boundary | Aluminum | Gas (int) | None | None | VIII.I-1<br>(SP-23) | 3.4.1-44 | A |

**Table 3.4.2-3-IP3: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Air – outdoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-8<br>(S-41) | 3.4.1-28 | A |
| Valve body | Pressure boundary | Carbon steel | Gas (int) | None | None | VIII.I-15<br>(SP-4) | 3.4.1-44 | A |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Flow-Accelerated Corrosion | VIII.B1-9<br>(S-15) | 3.4.1-29 | C |
| Valve body | Pressure boundary | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 404 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Periodic Surveillance and Preventive Maintenance | -- | -- | G, 407 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-38<br>(S-10) | 3.4.1-4 | A, 404 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |

**Table 3.4.2-3-IP3: Auxiliary Feedwater System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Valve body | Pressure boundary | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | One-Time Inspection | -- | -- | G, 407 |
| Valve body | Pressure boundary | Stainless steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-32<br>(SP-16) | 3.4.1-16 | A, 404 |
| Valve body | Pressure boundary<br>Flow control | Carbon steel | Air – indoor (ext) | Loss of material | External Surfaces Monitoring | VIII.H-7<br>(S-29) | 3.4.1-28 | A |
| Valve body | Pressure boundary<br>Flow control | Carbon steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary<br>Flow control | Carbon steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-16<br>(S-06) | 3.4.1-2 | C, 404 |

| Table 3.4.2-3-IP3: Auxiliary Feedwater System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary<br>Flow control | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.G-38<br>(S-10) | 3.4.1-4 | A, 404 |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Steam (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.A-10<br>(SP-44) | 3.4.1-39 | C |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Steam (int) | Cracking – fatigue | TLAA – metal fatigue | -- | -- | H |
| Valve body | Pressure boundary<br>Flow control | Stainless steel | Steam (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.A-12<br>(SP-43) | 3.4.1-37 | C |

# Table 3.4.2-4-IP2
# Steam Generator Blowdown System
# Summary of Aging Management Review

**Table 3.4.2-4-IP2: Steam Generator Blowdown System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | -- | -- | I, 401 |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | -- | -- | I, 401 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.F-26<br>(S-16) | 3.4.1-29 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25<br>(S-10) | 3.4.1-4 | A, 404 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | -- | -- | I, 401 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |

| **Table 3.4.2-4-IP2: Steam Generator Blowdown System** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.F-26<br>(S-16) | 3.4.1-29 | A |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25<br>(S-10) | 3.4.1-4 | A, 404 |

# Table 3.4.2-4-IP3
# Steam Generator Blowdown System
# Summary of Aging Management Review

**Table 3.4.2-4-IP3: Steam Generator Blowdown System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bolting | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | -- | -- | I, 401 |
| Bolting | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | C |
| Piping | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | -- | -- | I, 401 |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10<br>(S-08) | 3.4.1-1 | C |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.F-26<br>(S-16) | 3.4.1-29 | A |
| Piping | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25<br>(S-10) | 3.4.1-4 | A, 404 |
| Piping | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10<br>(SP-12) | 3.4.1-41 | A |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-24<br>(SP-17) | 3.4.1-14 | A, 404 |

**Table 3.4.2-4-IP3: Steam Generator Blowdown System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C, 406 |
| Piping | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-23 (SP-16) | 3.4.1-16 | A, 404 |
| Tubing | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10 (SP-12) | 3.4.1-41 | A |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-24 (SP-17) | 3.4.1-14 | A, 404 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C, 406 |
| Tubing | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-23 (SP-16) | 3.4.1-16 | A, 404 |
| Valve body | Pressure boundary | Carbon steel | Air – indoor (ext) | None | None | -- | -- | I, 401 |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Cracking – fatigue | TLAA – metal fatigue | VIII.B1-10 (S-08) | 3.4.1-1 | C |
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Flow-Accelerated Corrosion | VIII.F-26 (S-16) | 3.4.1-29 | A |

**Table 3.4.2-4-IP3: Steam Generator Blowdown System**

| Component Type | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Valve body | Pressure boundary | Carbon steel | Treated water (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-25 (S-10) | 3.4.1-4 | A, 404 |
| Valve body | Pressure boundary | CASS | Air – indoor (ext) | None | None | VIII.I-10 (SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | CASS | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-24 (SP-17) | 3.4.1-14 | A, 404 |
| Valve body | Pressure boundary | CASS | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C, 406 |
| Valve body | Pressure boundary | CASS | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-23 (SP-16) | 3.4.1-16 | A, 404 |
| Valve body | Pressure boundary | Stainless steel | Air – indoor (ext) | None | None | VIII.I-10 (SP-12) | 3.4.1-41 | A |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking | Water Chemistry Control – Primary and Secondary | VIII.F-24 (SP-17) | 3.4.1-14 | A, 404 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Cracking – fatigue | TLAA – metal fatigue | VII.E1-16 (A-57) | 3.3.1-2 | C, 406 |
| Valve body | Pressure boundary | Stainless steel | Treated water > 140°F (int) | Loss of material | Water Chemistry Control – Primary and Secondary | VIII.F-23 (SP-16) | 3.4.1-16 | A, 404 |

## 3.5 STRUCTURES AND COMPONENT SUPPORTS

### 3.5.1 Introduction

This section provides the results of the aging management review for structural components and commodities that are subject to aging management review. The following structures and commodity groups are addressed in this section (descriptions are available in the referenced sections).

- Containment Building (Section 2.4.1)
- Water Control Structures (Section 2.4.2)
- Turbine Building, Auxiliary Building, and Other Structures (Section 2.4.3)
- Bulk Commodities (Section 2.4.4)

Table 3.5.1, Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapters II and III of NUREG-1801, provides the summary of the programs evaluated in NUREG-1801 for structures and component supports. Hyperlinks are provided to the program evaluations in Appendix B.

### 3.5.2 Results

The following tables summarize the results of aging management reviews and the NUREG-1801 comparison for structures and component supports.

- Table 3.5.2-1 Containment Building—Summary of Aging Management Review
- Table 3.5.2-2 Water Control Structures—Summary of Aging Management Review
- Table 3.5.2-3 Turbine Building, Auxiliary Building, and Other Structures—Summary of Aging Management Review
- Table 3.5.2-4 Bulk Commodities—Summary of Aging Management Review

### 3.5.2.1 Materials, Environments, Aging Effects Requiring Management and Aging Management Programs

The following sections list the materials, environments, aging effects requiring management, and aging management programs for structural components and commodities subject to aging management review. Programs are described in Appendix B. Further details are provided in the structure and commodities tables.

#### 3.5.2.1.1 Containment Building

**Materials**

Containment building components subject to aging management review are constructed of the following materials.

- carbon steel
- concrete
- elastomer
- Lubrite
- nickel alloy
- stainless steel

**Environment**

Containment building components subject to aging management review are exposed to the following environments.

- air – indoor uncontrolled
- air – outdoor
- air with borated water leakage
- exposed to fluid environment
- soil

**Aging Effects Requiring Management**

The following aging effects associated with containment building components require management.

- cracking
- change in material properties
- loss of material

**Aging Management Programs**

The following programs are credited for managing the effects of aging on containment building components.

- Boric Acid Corrosion Prevention
- Containment Inservice Inspection (CII– IWE)
- Containment Inservice Inspection (CII– IWL)
- Containment Leak Rate
- Fire Protection
- ISI – IWF
- Periodic Surveillance and Preventive Maintenance
- Structures Monitoring
- Water Chemistry Control – Primary and Secondary

### 3.5.2.1.2 Water Control Structures

**Materials**

Water control structures components subject to aging management review are constructed of the following materials.

- carbon steel
- concrete
- concrete brick
- galvanized steel

**Environment**

Water control structures components subject to aging management review are exposed to the following environments.

- air – indoor uncontrolled
- air – outdoor
- exposed to fluid environment
- soil

**Aging Effects Requiring Management**

The following aging effects associated with water control structures components require management.

- cracking
- loss of material

**Aging Management Programs**

The following aging management programs are credited for managing the aging effects for the water control structures components.

- Masonry Wall
- Structures Monitoring

### 3.5.2.1.3 Turbine Building, Auxiliary Building, and Other Structures

**Materials**

Turbine building, auxiliary building, and other structures components subject to aging management review are constructed of the following materials.

- carbon steel
- concrete
- concrete block
- concrete brick
- galvanized steel
- stainless steel

**Environment**

Turbine building, auxiliary building, and other structures components subject to aging management review are exposed to the following environments.

- air – indoor uncontrolled
- air – outdoor
- exposed to fluid environment
- soil

**Aging Effects Requiring Management**

The following aging effects associated with turbine building, auxiliary building, and other structures components require management.

- cracking
- loss of material

**Aging Management Programs**

The following aging management programs are credited for managing the effects of aging on turbine building, auxiliary building, and other structures components.

- Fire Protection
- Masonry Wall

- Structures Monitoring
- Water Chemistry Control – Primary and Secondary

### 3.5.2.1.4 Bulk Commodities

**Materials**

Bulk commodities subject to aging management review are constructed of the following materials.

- aluminum
- carbon steel
- cera blanket
- cerafiber
- concrete
- elastomer
- fiberglass/calcium silicate
- galvanized steel
- mineral wool
- pyrocrete
- stainless steel

**Environment**

Bulk commodities subject to aging management review are exposed to the following environments.

- air – indoor uncontrolled
- air – outdoor
- air with borated water leakage
- exposed to fluid environment
- soil

**Aging Effects Requiring Management**

The following aging effects associated with bulk commodities require management.

- cracking
- cracking/delamination
- change in material properties
- loss of material
- separation

**Aging Management Programs**

The following aging management programs are credited for managing the effects of aging on bulk commodities.

- Boric Acid Corrosion Prevention
- Fire Protection
- Fire Water System
- Inservice Inspection (ISI-IWF)
- Structures Monitoring
- Water Chemistry Control – Primary and Secondary

### 3.5.2.2 Further Evaluation of Aging Management as Recommended by NUREG-1801

NUREG-1801 indicates that further evaluation is necessary for certain aging effects and other issues discussed in Section 3.5.2.2 of NUREG-1800. The following sections are numbered in accordance with the discussions in NUREG-1800 and explain the IPEC approach to those areas requiring further evaluation. Programs are described in Appendix B.

#### 3.5.2.2.1 PWR and BWR Containments

#### 3.5.2.2.1.1 Aging of Inaccessible Concrete Areas

Concrete in accessible and inaccessible areas is designed in accordance with American Concrete Institute (ACI) specification ACI 318, Building Code Requirements for Reinforced Concrete, which results in low permeability and resistance to aggressive chemical attack by requiring the following.

- high cement content
- low water-to-cement ratio
- proper curing
- adequate air entrainment

IPEC concrete also meets requirements of later ACI guide ACI 201.2R-77, Guide to Durable Concrete, since both documents use the same American Society for Testing and Material (ASTM) standards for selection, application and testing of concrete.

The below-grade environment is not aggressive (pH > 5.5, chlorides < 500 ppm, and sulfates < 1,500 ppm). Concrete was provided with at least the minimum required air content between 4% and 6% and a low water/cement ratio. Water/cement ratios were in accordance with requirements of the version of ACI 318 used in IPEC construction, which allows a ratio of up to 0.576 for concrete with the compressive strength specified for IPEC concrete. Although specified water/cement ratios fall outside the established range of 0.35 to 0.45 provided in the guidance of NUREG-1801, IPEC concrete meets the specifications of ACI to ensure acceptable quality concrete is obtained. Therefore, increase in porosity and permeability, cracking, loss of material (spalling, scaling) due to aggressive chemical attack, and cracking, loss of bond, and loss of material (spalling, scaling) due to corrosion of embedded steel are not applicable for concrete in inaccessible areas. The absence of concrete aging effects is confirmed under the Containment Inservice Inspection (CII– IWL) and Structures Monitoring Programs.

#### 3.5.2.2.1.2 Cracks and Distortion due to Increased Stress Levels from Settlement; Reduction of Foundation Strength, Cracking and Differential Settlement due to Erosion of Porous Concrete Subfoundations, if Not Covered by Structures Monitoring Program

IPEC does not rely on a dewatering system for control of settlement. Structures are founded on bedrock. IN 97-11 does not identify IPEC as a plant susceptible to erosion of a porous concrete containment subfoundation. IPEC does not have a porous concrete containment foundation.

As a result, cracking and distortion due to increased stress level from settlement and reduction of foundation strength cracking and differential settlement due to erosion of porous concrete subfoundation are not aging effects requiring management for IPEC concrete structures. The absence of concrete aging effects is confirmed under the Containment Inservice Inspection (CII– IWL) and Structures Monitoring Program.

#### 3.5.2.2.1.3 Reduction of Strength and Modulus of Concrete Structures due to Elevated Temperature

The aging effect "change in material properties" is equivalent to the NUREG-1801 aging effect "reduction of strength and modulus of elasticity.”

ACI 349 specifies long-term concrete temperature limits of 150°F for general areas and 200°F for local areas. The effects of aging due to elevated temperature exposure are not significant below these temperatures.

For Unit 2 containment during normal operation, areas are maintained below a bulk average temperature of 130ºF. Piping penetrations through the containment cylinder wall associated with pipes carrying hot fluid are cooled using air-to-air heat exchangers and the pipes are insulated to maintain the temperature in the adjoining concrete below 250°F. NUREG-1801 allows for concrete temperatures higher than 200°F for local areas if tests or calculations are provided to evaluate the reduction in strength. Concrete associated with the Unit 2 hot piping penetrations has been evaluated and determined acceptable at temperatures up to 250°F.

For Unit 3 containment during normal operation, areas are maintained below a bulk average temperature of 130ºF. Piping penetrations through the containment cylinder wall associated with pipes carrying hot fluid are cooled using air-to-air heat exchangers and the pipes are insulated to maintain the temperature in the adjoining concrete below 200°F.

Therefore, change in material properties due to elevated temperature is not an aging effect requiring management for containment concrete. The absence of concrete aging effects is confirmed under the Containment Inservice Inspection (CII– IWL) and Structures Monitoring Program.

#### 3.5.2.2.1.4 Loss of Material Due to General, Pitting and Crevice Corrosion

IPEC containment building concrete is designed in accordance with specification ACI 318, Building Code Requirements for Reinforced Concrete. The concrete meets requirements of later ACI guide ACI 201.2R-77 since both documents use the same ASTM standards for selection, application and testing of concrete. Spills (e.g., borated water spill) are cleaned up in timely manner. Interior concrete is monitored for cracks under the Structures Monitoring Program. The steel liner plate and moisture barrier where the steel liner becomes embedded in the concrete floor are inspected in accordance with the Containment Inservice Inspection (CII– IWE).

To prevent corrosion of the lower portion of the liner plate, the interior and exterior surfaces are protected from contact with the atmosphere by complete concrete encasement. It is not credible for ground water to reach the liner plate, assuming a crack in the concrete, since the concrete at this location is greater than five feet thick and poured in multiple horizontal planes. Therefore, corrosion of the liner plate is not expected.

#### 3.5.2.2.1.5 Loss of Prestress due to Relaxation, Shrinkage, Creep, and Elevated Temperature

The IPEC containment structures are constructed of reinforced concrete. There are no prestressed tendons associated with the design. Therefore, loss of prestress due to relaxation, shrinkage, creep, and elevated temperature do not apply.

#### 3.5.2.2.1.6 Cumulative Fatigue Damage

TLAA are evaluated in accordance with 10 CFR 54.21(c) as documented in Section 4. Fatigue TLAAs for containment steel liner and associated penetrations are evaluated as documented in Section 4.6. The only associated TLAA involves the liner plate at the penetration for feedwater line #22 on IP2.

A fatigue analysis does not exist for the other penetration components.

The NUREG-1801 BWR components, i.e., suppression pool shell and unbraced downcomers, are not applicable to the IPEC containment.

#### 3.5.2.2.1.7 Cracking due to Stress Corrosion Cracking

NUREG-1801 recommends further evaluation of inspection methods to detect cracking due to SCC since visual VT-3 examinations may be unable to detect this aging effect. Potentially susceptible components at IPEC are penetration sleeves and bellows.

Stress corrosion cracking (SCC) is an aging mechanism that requires the simultaneous action of an aggressive chemical environment, sustained tensile stress, and a susceptible material. Elimination of any one of these elements will eliminate susceptibility to SCC. Stainless steel elements of containment, including dissimilar welds, are not susceptible to SCC because these elements are not subject to an aggressive chemical environment. A review of plant operating experience did not identify cracking of these components.

#### 3.5.2.2.1.8 Cracking due to Cyclic Loading

This subsection lists components associated with containment that require aging management for cracking due to cyclic loading given that CLB fatigue analyses were not part of their original design bases. Specifically, components requiring aging management for cracking due to cyclic loading include containment mechanical penetrations, penetration sleeves and associated dissimilar metal welds. These components are designed to stress levels without requiring fatigue analyses and thus fine cracks are unlikely to occur. Therefore, existing requirements for leak rate testing per the Containment Leak Rate Program and surface inspection per the Containment In-Service Inspection (CII-IWE) Program are adequate to detect cracking due to cyclic loading.

This subsection also lists components associated with BWR primary containment that require aging management for crack initiation and growth due to stress corrosion cracking (SCC). These components are not applicable to IPEC, a PWR.

#### 3.5.2.2.1.9 Loss of Material (Scaling, Cracking, and Spalling) due to Freeze-Thaw

IPEC inaccessible and accessible concrete areas are designed in accordance with American Concrete Institute (ACI) specification ACI 318, Building Code Requirements for Reinforced Concrete, which results in low permeability and resistance to aggressive chemical solutions by requiring the following.

- high cement content
- low water-to-cement ratio

- proper curing
- adequate air entrainment

IPEC concrete also meets requirements of later ACI guide ACI 201.2R-77, Guide to Durable Concrete, since both documents use the same American Society for Testing and Material (ASTM) standards for selection, application and testing of concrete. Therefore loss of material (scaling, cracking and spalling) due to freeze-thaw is not applicable for concrete in inaccessible areas. The absence of concrete aging effects is confirmed under the Containment Inservice Inspection (CII– IWL) and Structures Monitoring Program.

#### 3.5.2.2.1.10 Cracking due to Expansion and Reaction with Aggregate, and Increase in Porosity and Permeability due to Leaching of Calcium Hydroxide

In accordance with NUREG-1801, aging management is not required because IPEC containment concrete (walls, dome, basemat and ring girder) is designed in accordance with specification ACI 318, Building Code Requirements for Reinforced Concrete, and concrete specification requires that the potential reactivity of aggregates be tested in accordance with ASTM C 289 and ASTM C 227. Also ASTM C 295 shall be used to identify elements in the aggregate which may be unfavorably reactive with alkalis in cement. Concrete structures are not exposed to flowing water and the concrete used was constructed in accordance with the recommendations in ACI 201.2R-77 for durability. Therefore, reaction with aggregates and increase in porosity and permeability due to leaching of calcium hydroxide is not an applicable aging mechanism for IPEC concrete structures. The absence of concrete aging effects is confirmed under the Containment Inservice Inspection (CII– IWL) and Structures Monitoring Program.

### 3.5.2.2.2 Safety-Related and Other Structures and Component Supports

Structure groups and component support groups as used in the following discussions are defined in NUREG-1800, Section 3.5.1.

#### 3.5.2.2.2.1 Aging of Structures Not Covered by Structures Monitoring Program

IPEC concrete structures subject to aging management review, except for containment concrete covered by Containment Inservice Inspection (CII– IWL), are included in the Structures Monitoring Program and supplemented by other aging management programs as appropriate. This is true for concrete items even if the aging management review did not identify aging effects requiring management. Aging effects discussed below for structural steel items are also addressed by the structures monitoring program. Additional discussion of specific aging effects follows.

1. Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling) Due to Corrosion of Embedded Steel for Groups 1-5, 7, 9 Structures

   The aging mechanisms associated with cracking, loss of bond, and loss of material (spalling, scaling) due to corrosion of embedded steel are applicable only to below-grade concrete/grout structures. The below-grade environment for IPEC is not aggressive and concrete is designed in accordance with specification ACI 318, Building Code Requirements for Reinforced Concrete, which results in low permeability and resistance to aggressive chemical solutions by providing a high cement, low water/cement ratio, proper curing and adequate air content (between 4% and 6%). Water/cement ratios were in accordance with requirements of the version of ACI 318 used in IPEC construction, which allows a ratio of up to 0.576 for concrete with the compressive strength specified for IPEC concrete. Although specified water/cement ratios fall outside the established range of 0.35 to 0.45 provided in the guidance of NUREG-1801, IPEC concrete meets the specifications of ACI to ensure acceptable quality concrete is obtained. Therefore, cracking, loss of bond, and loss of material (spalling, scaling) due to corrosion of embedded steel are not aging effects requiring management for IPEC Groups 1-5, 7, 9 structures.

2. Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling) Due to Aggressive Chemical Attack for Groups 1-5, 7, 9 Structures

   Aggressive chemical attack becomes significant to concrete exposed to an aggressive environment. Resistance to mild acid attack is enhanced by using a dense concrete with low permeability and a low water-to-cement ratio. These groups of structures at IPEC use a dense low-permeable concrete with a water-to-cement ratio that met the ACI 318 requirements, which provides an acceptable degree of protection against aggressive chemical attack. Water chemical analysis results confirm that the site groundwater is non-aggressive. IPEC concrete is constructed in accordance with the recommendations in ACI 201.2R-77 for durability.

   IPEC below-grade environment is not aggressive. Therefore, increase in porosity and permeability cracking, loss of material (spalling, scaling) due to aggressive chemical attack are not aging effects requiring management for IPEC Groups 1-5, 7, 9 concrete structures.

3. Loss of Material Due to Corrosion for Groups 1-5, 7, 8 Structures

   IPEC Structures Monitoring Program and Containment Inservice Inspection (CII–IWE) for containment steel liner will be used to manage this aging effect for IPEC Groups 1-5, 7, 8 structures.

4. Loss of Material (Spalling, Scaling) and Cracking Due to Freeze-Thaw for Groups 1-3, 5, 7-9 Structures

   Aggregates were in accordance with specifications and materials conforming to ACI and ASTM standards. IPEC structures are constructed of a dense, durable mixture of sound coarse aggregate, fine aggregate, cement, water, and admixture. Water/cement ratios are within the limits provided in ACI 318 and air entrainment percentages are within the range prescribed in NUREG-1801. Therefore, loss of material (spalling, scaling) and cracking due to freeze thaw are not aging effects requiring management for IPEC Groups 1-3, 5, 7-9 structures.

5. Cracking Due to Expansion and Reaction with Aggregates for Groups 1-5, 7-9 Structures

   Aggregates were selected locally and were in accordance with specifications and materials conforming to ACI and ASTM standards at the time of construction, which are in accordance with the recommendations in ACI 201.2R-77 for concrete durability. IPEC structures are constructed of a dense, durable mixture of sound coarse aggregate, fine aggregate, cement, water, and admixture. Water/ cement ratios are within the limits provided in ACI 318, and air entrainment percentages were within the range prescribed in NUREG-1801. Therefore, cracking due to expansion and reaction with aggregates for Groups 1-5, 7-9 structures is not an aging effect requiring management.

6. Cracks and Distortion Due to Increased Stress Levels from Settlement for Groups 1-3, 5-9 Structures

   For Groups 1-3, 5-9 structures at IPEC, settlement is not credible since structures are founded on bedrock. Therefore, cracks and distortion due to increased stress levels from settlement for Groups 1-3, 5-9 structures is not an aging effect requiring management for IPEC concrete.

7. Reduction in Foundation Strength, Cracking, Differential Settlement Due to Erosion of Porous Concrete Subfoundation for Groups 1-3, 5-9 Structures

   IPEC concrete was provided in accordance with ACI 318 requirements resulting in dense, well-cured, high-strength concrete with low permeability, and a porous subfoundation is not provided. Structures are supported on bedrock, and erosion of the subfoundation is not credible since the subfoundation bears directly against the bedrock and the possibility of loss of soil resulting in voids below the subgrade is not credible. Operating history has not identified settlement and therefore reduction in foundation strength, cracking, differential settlement due to erosion of porous concrete subfoundation are not aging effects requiring management for IPEC Groups 1-3, 5-9 structures.

8. Lock Up Due to Wear for Lubrite® Radial Beam Seats in BWR Drywell and Other Sliding Support Surfaces

   IPEC is a reinforced concrete containment and does not contain radial beam seats; therefore, lockup due to wear for this component is not applicable. IPEC does use lubrite plate in support applications inside containment; however, owing to the wear-resistant material used, the low frequency of movement, and the slow movement between sliding surfaces, lock-up due to wear is not an aging effect requiring management at IPEC. Nevertheless, Lubrite® plates are included within the Inservice Inspection (ISI-IWF) Program to confirm the absence of aging effects requiring management for these components.

###### 3.5.2.2.2.2 Aging Management of Inaccessible Areas

IPEC concrete for Group 1-3, 5 and 7-9 inaccessible concrete areas was provided in accordance with specification ACI 318, Building Code Requirements for Reinforced Concrete, which requires the following, resulting in low permeability and resistance to aggressive chemical solution.

- high cement content
- low water permeability
- proper curing
- adequate air entrainment

IPEC concrete also meets requirements of later ACI guide ACI 201.2R-77, Guide to Durable Concrete, since both documents use the same ASTM standards for selection, application and testing of concrete.

Inspections of accessible concrete have not revealed degradation related to corrosion of embedded steel. IPEC below-grade environment is not aggressive as defined in NUREG-1801. Therefore, loss of material due to corrosion of embedded steel is not an aging effect requiring management for IPEC concrete.

###### 3.5.2.2.2.3 Reduction of Strength and Modulus of Concrete Structures due to Elevated Temperature

For reduction of strength and modulus of concrete structures due to elevated temperatures for Groups 1-5, NUREG-1801 recommends a plant-specific AMP and further evaluation if the general temperature is greater than 150ºF or if the local temperature is greater than 200ºF. During normal operation, bulk average temperature of Groups 1-5 concrete elements is maintained below 150ºF and local temperatures remain below 200ºF.

Group 1-5 concrete elements remain at temperatures below the temperature limits associated with aging degradation due to elevated temperature. Therefore, reduction of strength and modulus due to elevated temperatures is not an aging effect requiring management for IPEC Group 1-5 concrete elements.

###### 3.5.2.2.2.4 Aging Management of Inaccessible Areas for Group 6 Structures

For inaccessible areas of certain Group 6 structures, aging effects are covered by inspections in accordance with the Structures Monitoring Program. The Structures Monitoring Program will include guidance to perform periodic engineering evaluations of groundwater samples to assess aggressiveness of groundwater to concrete.

1. Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)/Aggressive Chemical Attack; and Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)/Corrosion of Embedded Steel in Below-Grade Inaccessible Concrete Areas of Group 6 Structures

   Below-grade exterior reinforced concrete at IPEC is not exposed to an aggressive environment (pH less than 5.5), or to chloride or sulfate solutions beyond defined limits (greater than 500 ppm chloride, or greater than 1500 ppm sulfate). Therefore, increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack; and cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel are not aging effects requiring management for below-grade inaccessible concrete areas of IPEC Group 6 structures.

2. Loss of Material (Spalling, Scaling) and Cracking Due to Freeze-thaw in Below-Grade Inaccessible Concrete Areas of Group 6 Structures

   Aggregates were selected locally and were in accordance with specifications and materials conforming to ACI and ASTM standards at the time of construction. IPEC structures are constructed of a dense, durable mixture of sound coarse aggregate, fine aggregate, cement, water, and admixture. Water/cement ratios are within the limits provided in ACI 318, and air entrainment percentages were within the range prescribed in NUREG-1801. Therefore, loss of material (spalling, scaling) and cracking due to freeze thaw are not aging effects requiring management for IPEC Groups 6 structures.

3. Cracking Due to Expansion and Reaction with Aggregates, Increase in Porosity and Permeability, and Loss of Strength Due to Leaching of Calcium Hydroxide in Below-Grade Inaccessible Concrete Areas of Group 6 Structures

   Aggregates were selected locally and were in accordance with specifications and materials conforming to ACI and ASTM standards at the time of construction, which are in accordance with the recommendations in ACI 201.2R-77 for concrete durability. IPEC structures are constructed of a dense, durable mixture of sound coarse aggregate, fine aggregate, cement, water, and admixture. Water/ cement ratios are within the limits provided in ACI 318-63, and air entrainment percentages were within the range prescribed in NUREG-1801. IPEC below-grade environment is not aggressive (pH > 5.5, chlorides < 500 ppm, and sulfates < 1,500 ppm).

Therefore, cracking due to expansion and reaction with aggregates, increase in porosity and permeability, and loss of strength due to leaching of calcium hydroxide in below-grade inaccessible concrete areas of Group 6 Structures is not an aging effect requiring management for IPEC concrete.

#### 3.5.2.2.2.5 Cracking due to Stress Corrosion Cracking and Loss of Material due to Pitting and Crevice Corrosion

NUREG-1800 Section 3.5.2.2.2.5 applies to stainless steel liners for concrete or steel tanks. No tanks with stainless steel liners are included in the scope of license renewal.

#### 3.5.2.2.2.6 Aging of Supports Not Covered by Structures Monitoring Program

NUREG-1801 recommends further evaluation of certain component support/aging effect combinations if they are not covered by the applicant's structures monitoring program. Component supports at IPEC are included in the Structures Monitoring Program for Groups B2 through B5 and Inservice Inspection (ISI-IWF) program for Group B1.

(1) Reduction in concrete anchor capacity due to degradation of the surrounding concrete for Groups B1 through B5 supports

IPEC concrete anchors and surrounding concrete are included in the Structures Monitoring Program (Groups B2 through B5) and Inservice Inspection (ISI-IWF) Program (Group B1).

(2) Loss of material due to general and pitting corrosion, for Groups B2 through B5 supports

Loss of material due to corrosion of steel support components is an aging effect requiring management at IPEC. The Structures Monitoring Program manages this aging effect. For components subject to loss of material due to boric acid corrosion, the Boric Acid Corrosion Prevention Program manages this aging effect.

(3) Reduction/loss of isolation function due to degradation of vibration isolation elements for Group B4 supports

The IPEC aging management review did not identify any component support structure/aging effect combination corresponding to NUREG-1801 Volume 2 Item III.B4.2-a.

3.5.2.2.2.7 Cumulative Fatigue Damage due to Cyclic Loading

TLAA are evaluated in accordance with 10 CFR 54.21(c) as documented in Section 4. During the process of identifying TLAAs in the IPEC current licensing basis, no fatigue analyses were identified for ASME component support members, anchor bolts, and welds.

#### 3.5.2.2.3 Quality Assurance for Aging Management of Nonsafety-Related Components

See Appendix B Section B.0.3 for discussion of IPEC quality assurance procedures and administrative controls for aging management programs.

### 3.5.2.3 Time-Limited Aging Analyses

Potential TLAA identified for structural components and commodities include fatigue analyses for concrete containment liner plate and penetration fatigue analyses. These topics are discussed in Section 4.6.

## 3.5.3 Conclusion

The structural components and commodities subject to aging management review have been identified in accordance with the criteria of 10 CFR 54.21. The aging management programs selected to manage the effects of aging on structural components and commodities are identified in Section 3.5.2.1 and the following tables. A description of the aging management programs is provided in Appendix B of this application, along with the demonstration that the identified aging effects will be managed for the period of extended operation.

Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the structural components and commodities will be managed such that there is reasonable assurance that the intended functions will be maintained consistent with the current licensing basis during the period of extended operation.

## Table 3.5.1
## Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapters II and III of NUREG-1801

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| *PWR Concrete (Reinforced and Prestressed) and Steel Containment*<br>*BWR Concrete (Mark II and III) and Steel (Mark I, II, and III) Containment* | | | | | |
| 3.5.1-1 | 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) and for inaccessible concrete, an examination of representative samples of below-grade concrete and periodic monitoring of groundwater if environment is nonaggressive. A plant specific program is to be evaluated if environment is aggressive. | Yes, plant-specific, if the environment is aggressive | See Section 3.5.2.2.1.1 for further discussion. Concrete elements are included in the CII-IWL and Structures Monitoring Program. IPEC does not rely on a dewatering system. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.5.1-2 | Concrete elements; All | Cracks and distortion due to increased stress levels from settlement | Structures Monitoring Program. 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 | Concrete elements are included in the CII-IWL and Structures Monitoring Program. IPEC does not rely on a de-watering system.<br>See Section 3.5.2.2.1.2 for further discussion. |
| 3.5.1-3 | Concrete elements: foundation, subfoundation | Reduction in foundation strength, cracking, differential settlement due to erosion of porous concrete subfoundation | Structures Monitoring Program. If a dewatering system is relied upon to control 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 | Erosion of porous concrete subfoundations is not applicable to the containment structures at IPEC.<br>For further discussion, see Section 3.5.2.2.1.2. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.5.1-4 | Concrete elements: dome, wall, basemat, ring girder, buttresses, containment, concrete fill-in annulus (as applicable) | Reduction of strength and modulus due to elevated temperature | A plant-specific aging management program is to be evaluated | Yes, plant-specific if temperature limits are exceeded | Reduction of strength and modulus due to elevated temperature is not applicable to the containment structures.<br>For further discussion, see Section 3.5.2.2.1.3. |
| 3.5.1-5 | BWR only | | | | |
| 3.5.1-6 | Steel elements: steel liner, liner anchors, integral attachments | Loss of material due to general, pitting and crevice corrosion | ISI (IWE) and 10 CFR Part 50, Appendix J | Yes, if corrosion is significant for inaccessible areas | CII-IWL, Containment Leak Rate and Structures Monitoring Programs will manage this aging effect.<br>For further discussion, see Section 3.5.2.2.1.4. |
| 3.5.1-7 | 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 | This item applies to prestressed concrete containments. It is not applicable to the IPEC steel-lined reinforced concrete containments.<br>For further discussion, see Section 3.5.2.2.1.5. |
| 3.5.1-8 | BWR only | | | | |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.5.1-9 | 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 | Refer to the evaluation in Section 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) and 10 CFR Part 50, Appendix J and additional appropriate examinations/ evaluations for bellows assemblies and dissimilar metal welds | Yes, detection of aging effects is to be evaluated | Cracking due to SCC is not applicable to these stainless steel components. For further discussion, see Section 3.5.2.2.1.7. |
| 3.5.1-11 | 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) and 10 CFR Part 50, Appendix J supplemented to detect fine cracks | Yes, detection of aging effects is to be evaluated | CII-IWE and Containment Leak Rate Programs will manage this aging effect. The CII-IWE Program includes augmented ultrasonic exams to detect fine cracks. For further discussion, see Section 3.5.2.2.1.8. |
| 3.5.1-13 | BWR only | | | | |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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) Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index >100 day-inch/yr) (NUREG-1557). | Yes, for plants located in moderate to severe weathering conditions | Loss of material due to freeze-thaw is not applicable. For further discussion, see Section 3.5.2.2.1.9. Nonetheless, components are included in the CII-IWL and Structures Monitoring Program. |
| 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) 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 | Cracking due to expansion and reaction with aggregate, increase in porosity, permeability due to leaching of calcium hydroxide is not applicable. For further discussion, see Section 3.5.2.2.1.10. Nonetheless, components are included in the CII-IWL and Structures Monitoring Program. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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) and 10 CFR Part 50, Appendix J | No | The aging effect cited in the NUREG-1801 item is loss of sealing. Loss of sealing is a consequence of the aging effects cracking and change in material properties. The terminology is considered technically equivalent. For IPEC the CII-IWE and Containment Leak Rate Programs are used to manage loss of sealant and leakage through containment due to deterioration of seals and gaskets. The CII-IWE Program is used to manage loss of seal and leakage of the moisture barrier at the containment liner to concrete floor slab interface. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 and Plant Technical Specifications | No | Locks, hinges, and closure mechanisms are active components and are therefore not subject to aging management review. Containment Leak Rate Program, supplemented by the CII-IWE program, and IPEC technical specifications require testing to ensure leak tightness of airlocks and hatches. |
| 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) and 10 CFR Part 50, Appendix J | No | CII-IWE and Containment Leak Rate Program will manage this aging effect. |
| 3.5.1-19 | BWR only | | | | |
| 3.5.1-20 | BWR only | | | | |
| 3.5.1-21 | BWR only | | | | |
| 3.5.1-22 | Prestressed containment: tendons and anchorage components | Loss of material due to corrosion | ISI (IWL) | No | This item applies to prestressed concrete containments. It is not applicable to the IPEC steel-lined reinforced concrete containments. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| *Safety-Related and Other Structures; and Component Supports* | | | | | |
| 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 | Yes, if not within the scope of the applicant's structures monitoring program | Corrosion of embedded steel becomes significant if exposed to an aggressive environment. Corrosion is not significant if the concrete has a low water-to cement ratio, low permeability, and is designed in accordance with ACI Standards (ACI-318 or ACI-349). Loss of bond is included with cracking for the purpose of this review. The design and construction of these structures at IPEC prevents corrosion of embedded steel. See Section 3.5.2.2.2.1 for further discussion.<br>Nonetheless, components are included in the CII-IWL for containment concrete supplemented by the Structures Monitoring Program. For the remaining groups except Group 6, concrete is included in the Structures Monitoring Program. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 | Yes, if not within the scope of the applicant's structures monitoring program | Listed aging effects do not require management at IPEC. See Section 3.5.2.2.2.1 for further discussion.<br>Nonetheless, components are included in the CII-IWL for containment concrete supplemented by the Structures Monitoring Program. For the remaining groups except Group 6, concrete is included in the Structures Monitoring Program. |
| 3.5.1-25 | All Groups except Group 6: steel components: all structural steel | Loss of material due to corrosion | Structures Monitoring Program. 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. Structures Monitoring Program manages loss of material. Protective coatings are not relied upon to manage the effects of aging. In some cases the Fire Protection Program supplements the Structures Monitoring Program. |

| **Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1** | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 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. 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 plants located in moderate to severe weathering conditions | Freeze-thaw is not an applicable aging mechanism for these groups of structures at IPEC. See Section 3.5.2.2.2.1 for further discussion.<br>Nonetheless, components are included in the CII-IWL for containment concrete supplemented by the Structures Monitoring Program. For the remaining groups except Group 6, concrete is included in the Structures Monitoring Program. In some cases the Fire Protection Program supplements the Structures Monitoring Program. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 201.2R-77. | Yes, if not within the scope of the applicant's structures monitoring program or concrete was not constructed as stated for inaccessible areas | Reaction with aggregates is not an applicable aging mechanism for concrete for these groups of structures at IPEC. See Section 3.5.2.2.2.1 for further discussion.<br>Nonetheless, components are included in the CII-IWL for containment concrete supplemented by the Structures Monitoring Program. For the remaining groups except Group 6, concrete is included in the Structures Monitoring Program. In some cases the Fire Protection Program supplements the Structures Monitoring Program. |
| 3.5.1-28 | Groups 1-3, 5-9: all | Cracks and distortion due to increased stress levels from settlement | Structures Monitoring Program. 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 | IPEC structures are founded on bedrock. Plant operating experience has not identified settlement of structures resulting in cracks and distortion of component structures; therefore, cracks and distortion are not aging effects requiring management. See discussion in Section 3.5.2.2.2.1. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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. 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 | This aging effect is not applicable to IPEC structures in scope of license renewal. A dewatering system is not used for control of settlement nor to prevent leaching of cement from concrete.<br>See additional discussion in Section 3.5.2.2.2.1. |
| 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 | ISI (IWF) or Structures Monitoring Program | Yes, if not within the scope of ISI or structures monitoring program | Lubrite plates are used in the support system for steam generator and RCP framing. Lubrite materials for nuclear applications are designed to resist deformation, have a low coefficient of friction, resist softening at elevated temperatures, resist corrosion, withstand high intensities of radiation, and will not score or mar; therefore, they are not susceptible to aging effects requiring management. Nonetheless, lubrite components associated with these components are included in the ISI-IWF Program. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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;<br>Cracking, loss of bond, and loss of material (spalling, scaling)/corrosion of embedded steel | Structures monitoring Program; 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, plant-specific, if environment is aggressive | IPEC concrete has a low water-to-cement ratio and low permeability and was designed in accordance with ACI Standards (ACI-318 or ACI-349). The design and construction of these groups of structures at IPEC prevents the effect of this aging from occurring; therefore, this aging effect does not require management. Loss of bond is included with cracking for the purpose of this review. Aging effects are not significant for accessible and inaccessible below-grade areas.<br>See discussion in Section 3.5.2.2.2.1. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | 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, loss of strength due to leaching of calcium hydroxide. | Structures Monitoring Program 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 | IPEC concrete has a low water-to-cement ratio and low permeability and was designed in accordance with ACI Standards (ACI-318 or ACI-349). The design and construction of these groups of structures at IPEC prevents the effect of this aging from occurring; therefore, this aging effect does not require management. Loss of bond is included with cracking for the purpose of this review. Aging effects are not significant for accessible and inaccessible below-grade areas.<br>See discussion in Section 3.5.2.2.2.1.<br>IPEC concrete elements do not exceed specified temperature limits. See discussion in Section 3.5.2.2.2.3. |
| 3.5.1-33 | Groups 1-5: concrete | Reduction of strength and modulus due to elevated temperature | Plant-specific | Yes, plant-specific if temperature limits are exceeded | IPEC concrete elements do not exceed specified temperature limits. See discussion in Section 3.5.2.2.2.3. |

| **Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1** | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 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 | Insp of Water-Control Structures or FERC/US Army Corps of Engineers dam inspections and maintenance programs, and for inaccessible concrete, exam of rep. samples of below-grade concrete, and periodic monitoring of groundwater, if environment is non-aggressive. Plant specific if environment is aggressive. | Yes, plant-specific if environment is aggressive | The listed aging effects are not significant for accessible and inaccessible areas because IPEC ground water is nonaggressive. The Structures Monitoring Program (SMP) will confirm the absence of aging effects requiring management for IPEC Group 6 components exposed to a fluid environment. SMP will include guidance to perform periodic evaluation of groundwater samples to assess aggressiveness of groundwater to concrete.<br>See Section 3.5.2.2.2.4. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | 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 or FERC/US Army Corps of Engineers dam inspections and maintenance programs. Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index >100 day-inch/yr) (NUREG-1557). | Yes, for plants located in moderate to severe weathering conditions | Aging effects are not applicable for accessible and inaccessible areas. These concrete structures are exposed to saturated water conditions near the ground surface; however, the concrete used at IPEC is designed with entrained air content of between 4% and 5% in conformance with ACI-318, and plant experience has not identified any degradation related to freeze-thaw. Nonetheless, the Structures Monitoring Program will confirm the absence of aging effects requiring management for IPEC Group 6 concrete components.<br>See Section 3.5.2.2.2.4 for additional discussion. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.5.1-36 | Group 6: all accessible/ inaccessible reinforced concrete | Cracking due to expansion/ reaction with aggregates | Accessible areas: Inspection of Water-Control Structures or FERC/US Army Corps of Engineers dam inspections and maintenance programs. 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 | Reaction with aggregates is not an applicable aging mechanism for IPEC concrete components. See Section 3.5.2.2.2.1 (this discussion is also applicable to Group 6, although the NUREG-1801 item refers to Groups 1-5, 7, 9). See Section 3.5.2.2.2.4 for additional discussion. Nonetheless, the Structures Monitoring Program will confirm the absence of aging effects requiring management for IPEC Group 6 concrete components. |
| 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 | For accessible areas, Inspection of Water-Control Structures or FERC/US Army Corps of Engineers dam inspections and maintenance programs. 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 | Not applicable. Nonetheless the Structures Monitoring Program will confirm the absence of aging effects requiring management for IPEC Group 6 concrete components.<br>See Section 3.5.2.2.2.4. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.5.1-38 | Groups 7, 8: Tank liners | Cracking due to stress corrosion cracking; loss of material due to pitting and crevice corrosion | Plant-specific | Yes, plant specific | There are no concrete or steel tanks with stainless steel liners in the scope of IPEC license renewal. |
| 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 | Yes, if not within the scope of the applicant's structures monitoring program | The Structures Monitoring Program will manage aging effects identified by this line item. In some cases the Fire Water System Program and Fire Protection Program supplement the Structures Monitoring Program. |
| 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 | Yes, if not within the scope of the applicant's structures monitoring program | IPEC concrete components are designed in accordance with accepted ACI standards. Plant experience has not identified reduction in concrete anchor capacity or other concrete aging mechanisms. Nonetheless, the Structures Monitoring Program will confirm absence of aging effects requiring management for IPEC concrete components.<br>See Section 3.5.2.2.2.6 for additional discussion. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.5.1-41 | Vibration isolation elements | Reduction or loss of isolation function/ radiation hardening, temperature, humidity, sustained vibratory loading | Structures Monitoring Program | Yes, if not within the scope of the applicant's structures monitoring program | No vibration isolation elements at IPEC are in scope and subject to aging management review. |
| 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 | Not applicable. No CLB fatigue analysis exists.<br>See Section 3.5.2.2.2.7 for additional discussion. |
| 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 | No | Consistent with NUREG-1801 for masonry walls within the station. The Masonry Wall Program manages this aging effect. In some cases Fire Protection Program supplements the Masonry Wall Program. |
| 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 | No | Loss of sealing is a consequence of elastomer cracking and change in material properties. Component types include compressible joints and seals and gaskets. The Structures Monitoring Program manages cracking and change in material properties. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 or FERC/US Army Corps of Engineers dam inspections and maintenance | No | Abrasion and cavitation due to flowing water are insignificant at IPEC due to the low flow velocities for these structures. Nonetheless, the Structures Monitoring Program will confirm absence of aging effects requiring management for IPEC Group 6 concrete components. |
| 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 and Monitoring of spent fuel pool water level in accordance with technical specifications and leakage from the leak chase channel. | No | At IPEC, the Water Chemistry Control – Primary and Secondary Program manages aging effects on the spent fuel pool liner. Monitoring spent fuel pool water level in accordance with technical specifications and monitoring leakage from the leak chase channels (Unit 3) will also continue during the period of extended operation.<br>Cracking due to stress corrosion is not an aging effect requiring management for treated water < 140°F. There are no stainless steel spent fuel components with intended functions exposed to treated water > 60°C (> 140°F). |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 or FERC/US Army Corps of Engineers dam inspections and maintenance programs. If protective coatings are relied upon to manage aging, protective coating monitoring and maintenance provisions should be included. | No | The listed aging management program is not used. The Structures Monitoring Program will confirm absence of aging effects requiring management for IPEC Group 6 steel components. |
| 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 or FERC/US Army Corps of Engineers dam inspections and maintenance programs. | No | Not applicable. IPEC does not have earthen water control structures. |
| 3.5.1-49 | BWR only | | | | |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | 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 | No | Consistent with NUREG-1801. The Structures Monitoring Program manages loss of material. |
| 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 | No | This NUREG-1801 item is not applicable. There are no high tensile strength bolting as defined by yield strength > 150 KSI or low alloy steel bolts (SA 193 Grade B7) used for NSSS component supports. |
| 3.5.1-52 | Groups B2, and B4: sliding support bearing 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 | No | Loss of mechanical function due to the listed mechanisms is not an aging effect. Such failures typically result from inadequate design or operating events rather than from the effects of aging. Failures due to cyclic thermal loads are rare for structural supports due to their relatively low temperatures. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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) | No | IPEC ISI-IWF Program manages this aging effect. |
| 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) | No | Loss of mechanical function due to the listed mechanisms is not an aging effect. Loss of mechanical function due to distortion, dirt, overload, fatigue due to vibratory, and cyclic thermal loads is not an aging effect requiring management. Such failures typically result from inadequate design or events rather than the effects of aging. Loss of material due to corrosion, which could cause loss of mechanical function, is addressed under Item 3.5.1-53 for Groups B1.1, B1.2, and B1.3 support members. |

**Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 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 | No | Consistent with NUREG-1801. The Boric Acid Corrosion Prevention Program manages loss of material. |
| 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) | No | Lubrite materials for nuclear applications are designed to resist deformation, have a low coefficient of friction, resist softening at elevated temperatures, resist corrosion, withstand high intensities of radiation, and will not score or mar; therefore, they are not susceptible to aging effects requiring management. Nonetheless, lubrite components associated with the steam generator and RCP supports are included in the ISI-IWF Program. |

| **Table 3.5.1: Structures and Component Supports, NUREG-1801 Vol. 1** | | | | | |
|---|---|---|---|---|---|
| **Item Number** | **Component** | **Aging Effect/ Mechanism** | **Aging Management Programs** | **Further Evaluation Recommended** | **Discussion** |
| 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) | No | No supports with vibration isolation elements have been identified in the scope of license renewal for IPEC. |
| 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 | NA - No AEM or AMP | Consistent with NUREG 1801. |
| 3.5.1-59 | Stainless steel support members; welds; bolted connections; support anchorage to building structure | None | None | NA - No AEM or AMP | Consistent with NUREG 1801. |

## Notes for Tables 3.5.2-1 through 3.5.2-4

### Generic Notes

A. Consistent with NUREG-1801 item for component, material, environment, aging effect and aging management program. AMP is consistent with NUREG-1801 AMP.

B. Consistent with NUREG-1801 item for component, material, environment, aging effect and aging management program. AMP has exceptions to NUREG-1801 AMP.

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

D. Component is different, but consistent with NUREG-1801 item for material, environment, aging effect and aging management program. AMP has exceptions to NUREG-1801 AMP.

E. Consistent with NUREG-1801 material, environment, and aging effect but a different aging management program is credited.

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.

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

J. Neither the component nor the material and environment combination is evaluated in NUREG-1801.

### Plant-Specific Notes

501. The IPEC environment is not conducive to the listed aging effects. However, the identified AMP will be used to confirm the absence of significant aging effects for the period of extended operation.

502. Loss of insulating characteristics due to insulation degradation is not an aging effect requiring management for insulation material. Insulation products, which are made from fiberglass fiber, calcium silicate, stainless steel, and similar materials, in an air – indoor uncontrolled environment do not experience aging effects that would significantly degrade their ability to insulate as designed. A review of site operating experience identified no aging effects for insulation used at IPEC.

## Table 3.5.2-1
## Containment Buildings Structural Components and Commodities
## Summary of Aging Management Review

**3.5.2-1: Containment Building Structural Components and Commodities (IP2 and IP3)**

| Structure and/or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Bellows penetration | PB, SSR | Stainless steel | Air – indoor uncontrolled | None | None | III.B1.1-9 (TP-5) | 3.5.1-59 | C |
| Bellows penetration | PB, SSR | Nickel alloy | Air – indoor uncontrolled | None | None | | | F |
| Jib cranes | SNS | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | VII B-3 (A-07) | 3.3.1-73 | E |
| Electrical penetration sleeves | PB, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | CII-IWE<br>Containment Leak Rate | II.A3-1 (C-12) | 3.5.1-18 | E |
| Equipment hatch | EN, PB, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | CII-IWE<br>Containment Leak Rate | II.A3-6 (C-16) | 3.5.1-18 | E |
| Fuel transfer tube penetration | PB, SSR | Stainless steel | Air – indoor uncontrolled | None | None | III.B1.1-9 (TP-5) | 3.5.1-59 | C |
| Liner plate and integral attachments | PB, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | CII-IWE<br>Containment Leak Rate | II.A1-11 (C-09) | 3.5.1-6 | E |
| Liner plate insulation jacket | EN, INS | Stainless steel | Air – indoor uncontrolled | None | None | III.B1.3-7 (TP-5) | 3.5.1-59 | C |

**3.5.2-1: Containment Building Structural Components and Commodities (IP2 and IP3)**

| Structure and/or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Manipulator crane, crane rails and girders | SNS | Carbon steel | Air – indoor uncontrolled | Loss of material | Periodic Surveillance and Preventive Maintenance | VII B-3 (A-07) | 3.3.1-73 | E |
| Mechanical penetration sleeves | PB, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | CII-IWE<br>Containment Leak Rate | II.A3-3 (C-14) | 3.5.1-12 | E |
| Monorails | SNS | Carbon steel | Air – indoor uncontrolled | Loss of material | Periodic Surveillance and Preventive Maintenance | VII B-3 (A-07) | 3.3.1-73 | E |
| Personnel lock | EN, PB, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | CII-IWE<br>Containment Leak Rate | II.A3-6 (C-16) | 3.5.1-18 | E |
| Polar crane, rails and girders | SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Periodic Surveillance and Preventive Maintenance | VII B-3 (A-07) | 3.3.1-73 | E |
| Pressurizer support framing | SSR | Carbon steel | Air with borated water leakage | Loss of material | Boric Acid Corrosion Prevention | III.B1.1-14 (T-25) | 3.5.1-55 | A |
| Pressurizer support framing | SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | ISI-IWF | III.B1.1-13 (T-24) | 3.5.1-53 | E |

**3.5.2-1: Containment Building Structural Components and Commodities (IP2 and IP3)**

| Structure and/or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Reactor coolant pump framing | SSR | Carbon steel | Air with borated water leakage | Loss of material | Boric Acid Corrosion Prevention | III.B1.1-14 (T-25) | 3.5.1-55 | A |
| Reactor coolant pump framing | SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | ISI-IWF | III.B1.1-13 (T-24) | 3.5.1-53 | E |
| Reactor vessel support framing (ring girder) | SSR | Carbon steel | Air with borated water leakage | Loss of material | Boric Acid Corrosion Prevention | III.B1.1-14 (T-25) | 3.5.1-55 | A |
| Reactor vessel support framing | SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | ISI-IWF | III.B1.1-13 (T-24) | 3.5.1-53 | E |
| Refueling canal liner plate | EN, SSR | Stainless steel | Exposed to fluid environments | Loss of material | Water Chemistry Control – Primary and Secondary | III.A5-13 (T-14) | 3.5.1-46 | E |
| Structural steel: beams, columns, plates, trusses | EN, MB, SNS, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.A1-12<br>III.A5-12 (T-11) | 3.5.1-25 | A |
| Sump liner and penetrations | EN, PB, SSR | Carbon steel | Exposed to fluid environment | Loss of material | CII-IWE<br>Containment Leak Rate | | | G |
| Sump screens, strainer and flow barriers | EN, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.A1-12 (T-11) | 3.5.1-25 | C |

**3.5.2-1: Containment Building Structural Components and Commodities (IP2 and IP3)**

| Structure and/or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Sump screens, strainer | EN, SSR | Stainless steel | Air – indoor uncontrolled | None | None | III.B1.3-7 (TP-5) | 3.5.1-59 | C |
| Beams, columns, interior walls, slabs | EN, MB, SNS, SSR | Concrete | Air – indoor uncontrolled | None | Structures Monitoring | | | I, 501 |
| Biological shield - pressurizer | EN, MB, SSR | Concrete | Air – indoor uncontrolled | None | Structures Monitoring | | | I, 501 |
| Cylinder wall below grade (exterior) | FLB, PB, SSR | Concrete | Soil | None | CII-IWL<br>Structures Monitoring | | | I, 501 |
| Dome, cylinder wall, basemat | FB, MB, PB, SSR | Concrete | Air – indoor uncontrolled | None | CII-IWL<br>Structures Monitoring<br>Fire Protection | | | I, 501 |
| Dome, cylinder wall, basemat | FB, MB, PB, SSR | Concrete | Air – outdoor | None | CII-IWL<br>Structures Monitoring<br>Fire Protection | | | I, 501 |
| Foundation, subfoundation | FLB, PB, SSR | Concrete | Soil | None | CII-IWL<br>Structures Monitoring | | | I, 501 |
| Reactor vessel support (concrete portion) | SSR | Concrete | Air – indoor uncontrolled | None | Structures Monitoring | | | I, 501 |

**3.5.2-1: Containment Building Structural Components and Commodities (IP2 and IP3)**

| Structure and/or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Refuel canal slab and walls | EN, PB, SSR | Concrete | Air – indoor uncontrolled | None | Structures Monitoring | | | I, 501 |
| Ring wall | EN, MB, SSR | Concrete | Air – indoor uncontrolled | None | Structures Monitoring | | | I, 501 |
| Sumps | PB, SSR | Concrete | Air – indoor uncontrolled | None | Structures Monitoring | | | I, 501 |
| Equipment hatch and personnel lock seals | PB, SSR | Elastomer | Air – indoor uncontrolled | Cracking<br>Change in material properties | Containment Leak Rate | II.A3-7 (C-18) | 3.5.1-16 | E |
| Electrical penetration sealant | PB, SSR | Elastomer | Air – indoor uncontrolled | Cracking<br>Change in material properties | Containment Leak Rate | II.A3-7 (C-18) | 3.5.1-16 | E |
| Lubrite sliding surfaces | SSR | Lubrite | Air – indoor uncontrolled | None | ISI-IWF | | | I, 501 |
| Moisture barrier | EN, SSR | Elastomer | Air – indoor uncontrolled | Cracking<br>Change in material properties | CII-IWE | II.A3-7 (C-18) | 3.5.1-16 | E |

# Table 3.5.2-2
# Water Control Structures Structural Components and Commodities
# Summary of Aging Management Review

**3.5.2-2: Water Control Structures Structural Components and Commodities (IP2 and IP3)**

| Structure and/or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Jib cranes | SNS | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | VII.B-3 (A-07) | 3.3.1-73 | E |
| Structural steel | EN, SNS, SSR | Galvanized steel | Air – indoor uncontrolled | None | None | III.B5-3 (TP-11) | 3.5.1-58 | A |
| Structural steel | EN, SNS, SSR | Galvanized steel | Air – outdoor | Loss of material | Structures Monitoring | III.A6-11 (T-21) | 3.5.1-47 | E |
| Structural steel | EN, SNS, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.A6-11 (T-21) | 3.5.1-47 | E |
| Structural steel | EN, SNS, SSR | Carbon steel | Exposed to fluid environment | Loss of material | Structures Monitoring | III.A6-11 (T-21) | 3.5.1-47 | E |
| Structural steel | EN, SNS, SSR | Carbon steel | Air – outdoor | Loss of material | Structures Monitoring | III.A6-11 (T-21) | 3.5.1-47 | E |
| Beams, columns, floor slabs and walls (above grade) | HS, SNS, SSR | Concrete | Air – indoor uncontrolled | None | Structures Monitoring | | | I, 501 |
| Beams, columns, floor slabs and walls (above grade) | HS, SNS, SSR | Concrete | Air – outdoor | None | Structures Monitoring | | | I, 501 |

**3.5.2-2: Water Control Structures Structural Components and Commodities (IP2 and IP3)**

| Structure and/or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Beams, columns, floor slabs and walls (below grade) | HS, SNS, SSR | Concrete | Exposed to fluid environment | Loss of material | Structures Monitoring | III.A6-7 (T-20) | 3.5.1-45 | E |
| Exterior walls below grade | HS, SNS, SSR | Concrete | Soil | None | Structures Monitoring | | | I, 501 |
| Foundation | HS, SNS, SSR | Concrete | Exposed to fluid environment | Loss of material | Structures Monitoring | III.A6-7 (T-20) | 3.5.1-45 | E |
| Masonry wall | SRE | Concrete brick | Air – outdoor | Cracking | Masonry Wall | III.A6-10 (T-12) | 3.5.1-43 | A |

# Table 3.5.2-3
# Turbine Building, Auxiliary Building, and Other Structures Structural Components and Commodities Summary of Aging Management Review

**Table 3.5.2-3: Turbine Building, Auxiliary Building, and Other Structures Structural Components and Commodities (IP2 and IP3)**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Control room ceiling support system | SNS | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.A1-12 (T-11) | 3.5.1-25 | A |
| Crane rails and girders | SNS | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | VII.B-3 (A-07) | 3.3.1-73 | E |
| Emergency lighting poles | SRE | Galvanized steel | Air – outdoor | Loss of material | Structures Monitoring | III.B4-7 (TP-6) | 3.5.1-50 | C |
| Fire protection panels | FB | Stainless steel | Air – indoor uncontrolled | None | None | III.B5-5 (TP-5) | 3.5.1-59 | C |
| Metal siding | EN, FB, SRE | Galvanized steel | Air – outdoor | Loss of material | Structures Monitoring | III.B4-7 (TP-6) | 3.5.1-50 | C |
| Monorails | SNS | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | VII.B-3 (A-07) | 3.3.1-73 | E |
| New fuel storage racks | EN, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.A3-12 (T-11) | 3.5.1-25 | A |
| New fuel storage racks | EN, SSR | Stainless steel | Air – indoor uncontrolled | None | None | III.B5-5 (TP-5) | 3.5.1-59 | A |
| Roof decking | FB, SRE | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.A3-12 (T-11) | 3.5.1-25 | C |

**Table 3.5.2-3: Turbine Building, Auxiliary Building, and Other Structures Structural Components and Commodities (IP2 and IP3)**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Roof decking | FB, SRE | Carbon steel | Air – indoor uncontrolled | Loss of material | Fire Protection | III.A3-12 (T-11) | 3.5.1-25 | E |
| Spent fuel pit bridge crane, rails and girders | SNS | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | VII.B-3 (A-07) | 3.3.1-73 | E |
| Spent fuel pool liner plate and gate (IP2) | EN, SSR | Stainless steel | Exposed to fluid environments | Loss of material | Water Chemistry Control – Primary and Secondary<br>Monitoring of spent fuel pool level per Tech Spec | III.A5-13 (T-14) | 3.5.1-46 | E |
| Spent fuel pool liner plate and gate (IP3) | EN, SSR | Stainless steel | Exposed to fluid environments | Loss of material | Water Chemistry Control – Primary and Secondary<br>Monitoring of spent fuel pool level per Tech Spec and monitoring leakage from leak chase channel | III.A5-13 (T-14) | 3.5.1-46 | A |
| Spent fuel pool storage racks | SSR | Stainless steel | Exposed to fluid environment | Loss of material | Water Chemistry Control – Primary and Secondary | VII.A2-1 (AP-79) | 3.3.1-91 | C |

**Table 3.5.2-3: Turbine Building, Auxiliary Building, and Other Structures Structural Components and Commodities (IP2 and IP3)**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Structural steel: beams, columns, plates | MB, SNS, SRE, SSR | Carbon steel | Air – outdoor | Loss of material | Structures Monitoring | III.A1-12<br>III.A3-12 (T-11) | 3.5.1-25 | A |
| Structural steel: beams, columns, plates | EN, MB, SRE, SNS, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.A1-12<br>III.A3-12 (T-11) | 3.5.1-25 | A |
| Structural steel: beams, columns, plates | EN, MB, SRE, SNS, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B5-7 (T-30) | 3.5.1-39 | A |
| Superheater stack | SNS | Carbon steel | Air – outdoor | Loss of material | Structures Monitoring | III.A3-12 (T-11) | 3.5.1-25 | C |
| Transmission towers | SRE | Galvanized steel | Air – outdoor | Loss of material | Structures Monitoring | III.B4-7 (TP-6) | 3.5.1-50 | C |
| Duct banks | EN, SRE, SSR | Concrete | Soil | None | Structures Monitoring | | | I, 501 |
| Exterior walls | EN, FB, MB, PB, SNS, SRE, SSR | Concrete | Air – indoor uncontrolled | None | Structures Monitoring<br>Fire Protection | | | I, 501 |
| Exterior walls | EN, FB, MB, PB, SNS, SRE, SSR | Concrete | Air – outdoor | None | Structures Monitoring<br>Fire Protection | | | I, 501 |

| **Table 3.5.2-3: Turbine Building, Auxiliary Building, and Other Structures Structural Components and Commodities (IP2 and IP3)** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Structure and/ or Component or Commodity** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Exterior walls-below grade | EN, MB, SNS, SRE, SSR | Concrete | Soil | None | Structures Monitoring | | | I, 501 |
| Floor slabs, interior walls, and ceilings | EN, FB, MB, PB, SNS, SRE, SSR | Concrete | Air – indoor uncontrolled | None | Structures Monitoring<br>Fire Protection | | | I, 501 |
| Foundations (transmission towers, buildings, transformers, tanks, circuit breakers, emergency lighting poles) | EN, SRE, SSR | Concrete | Soil | None | Structures Monitoring | | | I, 501 |
| Manholes | EN, SRE, SSR | Concrete | Air – outdoor | None | Structures Monitoring | | | I, 501 |
| Manholes | EN, SRE, SSR | Concrete | Soil | None | Structures Monitoring | | | I, 501 |
| Masonry walls | EN, FB, SNS, SRE, SSR | Concrete block | Air – indoor uncontrolled | Cracking | Masonry Wall<br>Fire Protection | III.A1-11<br>III.A3-11 (T-12) | 3.5.1-43 | E |

**Table 3.5.2-3: Turbine Building, Auxiliary Building, and Other Structures Structural Components and Commodities (IP2 and IP3)**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Masonry walls | EN, FB, SNS | Concrete block | Air – outdoor | Cracking | Masonry Wall<br>Fire Protection | III.A1-11<br>III.A3-11 (T-12) | 3.5.1-43 | E |
| Masonry walls | EN, FB, SNS | Concrete brick | Air – outdoor | Cracking | Masonry Wall<br>Fire Protection | III.A1-11<br>III.A3-11 (T-12) | 3.5.1-43 | E |
| Masonry walls | EN, FB, SNS | Concrete brick | Air – indoor uncontrolled | Cracking | Masonry Wall<br>Fire Protection | III.A1-11<br>III.A3-11 (T-12) | 3.5.1-43 | E |
| Roof slab | EN, FB, MB, PB, SNS, SRE, SSR | Concrete | Air – outdoor | None | Structures Monitoring<br>Fire Protection | | | I, 501 |
| Shield wall | EN, MB, SNS | Concrete | Air – indoor uncontrolled | None | Structures Monitoring | | | I, 501 |
| Shield wall | EN, MB, SNS | Concrete | Air – outdoor | None | Structures Monitoring | | | I, 501 |

# Table 3.5.2-4
# Bulk Commodities
# Summary of Aging Management Review

**Table 3.5.2-4: Bulk Commodities**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Anchorage / embedments | SNS, SRE, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B2-10<br>III.B3-7<br>III.B4-10<br>III.B5-7<br>(T-30) | 3.5.1-39 | A |
| | | | | | ISI-IWF | III.B1.1-13<br>III.B1.2-10<br>III.B1.3-10<br>(T-24) | 3.5.1-53 | E |
| Anchorage / embedments | SNS, SRE, SSR | Carbon steel | Air – outdoor | Loss of material | Structures Monitoring | III.B2-10<br>III.B3-7<br>III.B4-10<br>III.B5-7<br>(T-30) | 3.5.1-39 | A |
| | | | | | ISI-IWF | III.B1.1-13<br>III.B1.2-10<br>III.B1.3-10<br>(T-24) | 3.5.1-53 | E |

| **Table 3.5.2-4: Bulk Commodities** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Structure and/ or Component or Commodity** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Anchorage / embedments | SNS, SRE, SSR | Carbon steel | Exposed to fluid environment | Loss of material | Structures Monitoring | III.A6-11 (T-21) | 3.5.1-47 | E |
| Anchorage / embedments | SNS, SRE, SSR | Carbon steel | Air with borated water leakage | Loss of material | Boric Acid Corrosion Prevention | III.B1.1-14 (T-25) | 3.5.1-55 | A |
| Anchorage / embedments | SNS, SRE, SSR | Stainless steel | Air with borated water leakage | None | None | III.B1.1-10 (TP-4) | 3.5.1-59 | A |
| Anchorage / embedments | SNS, SRE, SSR | Stainless steel | Air – indoor | None | None | III.B1.1-9 (TP-5) | 3.5.1-59 | A |
| Base plates | SNS, SRE, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B2-10<br>III.B3-7<br>III.B4-10<br>III.B5-7 (T-30) | 3.5.1-39 | A |
| | | | | | ISI-IWF | III.B1.1-13<br>III.B1.2-10<br>III.B1.3-10 (T-24) | 3.5.1-53 | E |
| Base plates | SNS, SRE, SSR | Carbon steel | Air with borated water leakage | Loss of material | Boric Acid Corrosion Prevention | III.B1.1-14<br>III.B1.2-11 (T-25) | 3.5.1-55 | A |

**Table 3.5.2-4: Bulk Commodities**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Base plates | SNS, SRE, SSR | Carbon steel | Air – outdoor | Loss of material | Structures Monitoring | III.B2-10<br>III.B3-7<br>III.B4-10<br>III.B5-7 (T-30) | 3.5.1-39 | A |
| | | | | | ISI-IWF | III.B1.1-13<br>III.B1.2-10<br>III.B1.3-10 (T-24) | 3.5.1-53 | E |
| Cable tray | SNS, SRE, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B2-10 (T-30) | 3.5.1-39 | C |
| Cable tray | SNS, SRE, SSR | Galvanized steel | Air – indoor uncontrolled | None | None | III.B2-5 (TP-11) | 3.5.1-58 | A |
| Cable trays support | SNS, SRE, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B2-10 (T-30) | 3.5.1-39 | A |
| Cable trays support | SNS, SRE, SSR | Carbon steel | Air with borated water leakage | Loss of material | Boric Acid Corrosion Prevention | III.B2-11 T-25) | 3.5.1-55 | A |
| Cable trays support | SNS, SRE, SSR | Galvanized steel | Air – indoor uncontrolled | None | None | III.B2-5 (TP-11) | 3.5.1-58 | A |
| Cable trays support | SNS, SRE, SSR | Galvanized steel | Air with borated water leakage | Loss of material | Boric Acid Corrosion Prevention | III.B2-6 (TP-3) | 3.5.1-55 | A |

**Table 3.5.2-4: Bulk Commodities**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Component and piping supports for ASME Class 1, 2, 3 and MC | SNS, SRE, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | ISI-IWF | III.B1.1-13<br>III.B1.2-10<br>III.B1.3-10<br>(T-24) | 3.5.1-53 | E |
| Component and piping supports for ASME Class 1, 2, 3 and MC | SNS, SRE, SSR | Carbon steel | Air – outdoor | Loss of material | ISI-IWF | III.B1.1-13<br>III.B1.2-10<br>III.B1.3-10<br>(T-24) | 3.5.1-53 | E |
| Component and piping supports for ASME Class 1, 2, 3 and MC | SNS, SRE, SSR | Stainless steel | Air – indoor uncontrolled | None | None | III.B1.1-9<br>III.B1.2-7<br>III.B1.3-7<br>(TP-5) | 3.5.1-59 | A |
| Component and piping supports | SNS, SRE, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B2-10<br>III.B3-7<br>III.B4-10<br>III.B5-7<br>(T-30) | 3.5.1-39 | A |

**Table 3.5.2-4: Bulk Commodities**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Component and piping supports | SNS, SRE, SSR | Carbon steel | Air – outdoor | Loss of material | Structures Monitoring | III.B2-10<br>III.B3-7<br>III.B4-10<br>III.B5-7 (T-30) | 3.5.1-39 | A |
| Component and piping supports | SNS, SRE, SSR | Stainless steel | Air – indoor uncontrolled | None | None | III.B2-8<br>III.B3-5<br>III.B4-8<br>III.B5-5 (TP-5) | 3.5.1-59 | A |
| Conduits | SNS, SRE, SSR | Galvanized steel | Air – indoor uncontrolled | None | None | III.B2-5 (TP-11) | 3.5.1-58 | A |
| Conduits | SNS, SRE, SSR | Galvanized steel | Air – outdoor | Loss of material | Structures Monitoring | III.B2-7 (TP-6) | 3.5.1-50 | C |
| Conduit supports | SNS, SRE, SSR | Galvanized steel | Air – indoor uncontrolled | None | None | III.B2-5 (TP-11) | 3.5.1-58 | A |
| Conduit supports | SNS, SRE, SSR | Galvanized steel | Air – outdoor | Loss of material | Structures Monitoring | III.B2-7 (TP-6) | 3.5.1-50 | C |
| Conduit supports | SNS, SRE, SSR | Galvanized steel | Air with borated water leakage | Loss of material | Boric Acid Corrosion Prevention | III.B2-6 (TP-3) | 3.5.1-55 | A |
| Conduit supports | SNS, SRE, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B2-10 (T-30) | 3.5.1-39 | A |

**Table 3.5.2-4: Bulk Commodities**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Conduit supports | SNS, SRE, SSR | Carbon steel | Air with borated water leakage | Loss of material | Boric Acid Corrosion Prevention | III.B2-11 (T-25) | 3.5.1-55 | A |
| Conduit supports | SNS, SRE, SSR | Carbon steel | Air – outdoor | Loss of material | Structures Monitoring | III.B2-10 (T-30) | 3.5.1-39 | A |
| Damper framing | FB, SRE | Carbon steel | Air – indoor uncontrolled | Loss of material | Fire Protection | III.B2-10 (T-30) | 3.5.1-39 | E |
| Electrical and instrument panels and enclosures | SNS, SRE, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B3-7 (T-30) | 3.5.1-39 | C |
| Electrical and instrument panels and enclosures | SNS, SRE, SSR | Carbon steel | Air – outdoor | Loss of material | Structures Monitoring | III.B3-7 (T-30) | 3.5.1-39 | C |
| Electrical and instrument panels and enclosures | SNS, SRE, SSR | Galvanized steel | Air – indoor uncontrolled | None | None | III.B3-3 (TP-11) | 3.5.1-58 | A |
| Electrical and instrument panels and enclosures | SNS, SRE, SSR | Galvanized steel | Air with borated water leakage | Loss of material | Boric Acid Corrosion Prevention | III.B3-4 (TP-3) | 3.5.1-55 | A |

| **Table 3.5.2-4: Bulk Commodities** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Structure and/ or Component or Commodity** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Electrical and instrument panels and enclosures | SNS, SRE, SSR | Galvanized steel | Air – outdoor | Loss of material | Structures Monitoring | III.B4-7 (TP-6) | 3.5.1-50 | C |
| Fire doors | FB | Carbon steel | Air – indoor uncontrolled | Loss of material | Fire Protection | VII.G-3 (A-21) | 3.3.1-63 | B |
| Fire hose reels | SRE | Carbon steel | Air – indoor uncontrolled | Loss of material | Fire Water System | III.B2-10 (T-30) | 3.5.1-39 | E |
| Flood, pressure and specialty doors | EN, FLB, PB | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.A1-12<br>III.A2-12<br>III.A3-12 (T-11) | 3.5.1-25 | C |
| Flood, pressure and specialty doors | EN, FLB, MB, PB | Carbon steel | Air – outdoor | Loss of material | Structures Monitoring | III.A1-12<br>III.A2-12<br>III.A3-12 (T-11) | 3.5.1-25 | C |
| HVAC duct supports | SNS, SRE, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B2-10 (T-30) | 3.5.1-39 | A |
| HVAC duct supports | SNS, SRE, SSR | Galvanized steel | Air – indoor uncontrolled | None | None | III.B2-5 (TP-11) | 3.5.1-58 | A |
| Instrument line supports | SNS, SRE, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B2-10 (T-30) | 3.5.1-39 | A |

**Table 3.5.2-4: Bulk Commodities**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Instrument line supports | SNS, SRE, SSR | Carbon steel | Air with borated water leakage | Loss of material | Boric Acid Corrosion Prevention | III.B2-11 (T-25) | 3.5.1-55 | A |
| Instrument line supports | SNS, SRE, SSR | Galvanized steel | Air – indoor uncontrolled | None | None | III.B2-5 (TP-11) | 3.5.1-58 | A |
| Instrument line supports | SNS, SRE, SSR | Galvanized steel | Air with borated water leakage | Loss of material | Boric Acid Corrosion Prevention | III.B2-6 (TP-3) | 3.5.1-55 | A |
| Instrument line supports | SNS, SRE, SSR | Stainless steel | Air – indoor uncontrolled | None | None | III.B2-8 (TP-5) | 3.5.1-59 | A |
| Instrument racks, frames and tubing trays | SNS, SRE, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B3-7 (T-30) | 3.5.1-39 | C |
| Instrument racks, frames and tubing trays | SNS, SRE, SSR | Carbon steel | Air with borated water leakage | Loss of material | Boric Acid Corrosion Prevention | III.B2-11 (T-25) | 3.5.1-55 | A |
| Instrument racks, frames and tubing trays | SNS, SRE, SSR | Galvanized steel | Air – indoor uncontrolled | None | None | III.B2-5 (TP-11) | 3.5.1-58 | A |
| Instrument racks, frames and tubing trays | SNS, SRE, SSR | Galvanized steel | Air with borated water leakage | Loss of material | Boric Acid Corrosion Prevention | III.B2-6 (TP-3) | 3.5.1-55 | A |

| **Table 3.5.2-4: Bulk Commodities** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Structure and/ or Component or Commodity** | **Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| Insulation jacket | INS, SNS | Stainless steel | Air – indoor uncontrolled | None | None | III.B1.3-7 (TP-5) | 3.5.1-59 | C, 502 |
| Insulation jacket | INS, SNS | Aluminum | Air – indoor uncontrolled | None | None | III.B1.3-4 (TP-8) | 3.5.1-58 | C, 502 |
| Manways, hatches and hatch covers | EN, FLB, MB, PB, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.A1-12<br>III.A2-12 (T-11) | 3.5.1-25 | C |
| | | | | | | III.A6-11 (T-21) | 3.5.1-47 | E |
| Manways, hatches and hatch covers | EN, FLB, MB, PB, SRE, SSR, SNS | Carbon steel | Air – outdoor | Loss of material | Structures Monitoring | III.A1-12<br>III.A3-12 (T-11) | 3.5.1-25 | C |
| | | | | | | III.A6-11 (T-21) | 3.5.1-47 | E |
| Missile shields | EN, MB | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B5-7 (T-30) | 3.5.1-39 | A |
| Penetration sleeves (mechanical/ electrical not penetrating containment boundary) | SSR, SNS, FLB | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B2-10 (T-30) | 3.5.1-39 | C |

**Table 3.5.2-4: Bulk Commodities**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Pipe whip restraints | SSR, SNS, EN | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B5-7 (T-30) | 3.5.1-39 | A |
| Stairway, handrail, platform, grating, decking, and ladders | SNS | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B5-7 (T-30) | 3.5.1-39 | A |
| Stairway, handrail, platform, grating, decking, and ladders | SNS | Galvanized steel | Air – indoor uncontrolled | None | None | III.B5-3 (TP-11) | 3.5.1-58 | A |
| Vents and louvers | SNS, SRE, SSR | Carbon steel | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.A1-12<br>III.A3-12 (T-11) | 3.5.1-25 | C |
| Vents and louvers | SNS, SRE, SSR | Carbon steel | Air – outdoor | Loss of material | Structures Monitoring | III.A1-12<br>III.A3-12 (T-11) | 3.5.1-25 | C |
| Vents and louvers | SNS, SRE, SSR | Aluminum | Air – outdoor | Loss of material | Structures Monitoring | III.B2-7<br>III.B4-7 (TP-6) | 3.5.1-50 | C |

**Table 3.5.2-4: Bulk Commodities**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Anchor bolts | SNS, SRE, SSR | Carbon steel (bolted connections) | Air – indoor uncontrolled | Loss of material | ISI-IWF | III.B1.1-13<br>III.B1.2-10<br>III.B1.3-10<br>(T-24) | 3.5.1-53 | E |
| Anchor bolts | SNS, SRE, SSR | Carbon steel (bolted connections) | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B2-10<br>III.B3-7<br>III.B4-10<br>III.B5-7<br>(T-30) | 3.5.1-39 | A |
| Anchor bolts | SNS, SRE, SSR | Carbon steel (bolted connections) | Air – outdoor | Loss of material | ISI-IWF | III.B1.1-13<br>III.B1.2-10<br>III.B1.3-10<br>(T-24) | 3.5.1-53 | E |
| Anchor bolts | SNS, SRE, SSR | Carbon steel (bolted connections) | Air – outdoor | Loss of material | Structures Monitoring | III.B2-10<br>III.B3-7<br>III.B4-10<br>III.B5-7<br>(T-30) | 3.5.1-39 | A |

**Table 3.5.2-4: Bulk Commodities**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Anchor bolts | SNS, SRE, SSR | Stainless steel (bolted connections) | Air – indoor uncontrolled | None | None | III.B2-8<br>III.B3-5<br>III.B4-8<br>III.B5-5<br>(TP-5) | 3.5.1-59 | A |
| Anchor bolts | SNS, SRE, SSR | Stainless steel (bolted connections) | Air – outdoor | Loss of material | Structures Monitoring | III.B2-7<br>III.B4-7<br>(TP-6) | 3.5.1-50 | A |
| Anchor bolts | SNS, SRE, SSR | Galvanized steel (bolted connections) | Air – indoor uncontrolled | None | None | III.B2-5<br>III.B3-3<br>III.B4-5<br>III.B5-3<br>(TP-11) | 3.5.1-58 | A |
| Anchor bolts | SNS, SRE, SSR | Galvanized steel (bolted connections) | Air – outdoor | Loss of material | Structures Monitoring | III.B2-7<br>III.B4-7<br>(TP-6) | 3.5.1-50 | A |
| ASME Class 1, 2, 3 and MC Supports bolting | SNS, SRE, SSR | Carbon steel (bolted connections) | Air – indoor uncontrolled | Loss of material | ISI-IWF | III.B1.1-13<br>III.B1.2-10<br>III.B1.3-10<br>(T-24) | 3.5.1-53 | E |

**Table 3.5.2-4: Bulk Commodities**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| ASME Class 1, 2, 3 and MC Supports bolting | SNS, SRE, SSR | Carbon steel (bolted connections) | Air – outdoor | Loss of material | ISI-IWF | III.B1.1-13<br>III.B1.2-10<br>III.B1.3-10 (T-24) | 3.5.1-53 | E |
| ASME Class 1, 2, 3 and MC Supports bolting | SNS, SRE, SSR | Stainless steel (bolted connections) | Air – indoor uncontrolled | None | None | III.B2-8<br>III.B3-5<br>III.B4-8<br>III.B5-5<br>(TP-5) | 3.5.1-59 | A |
| ASME Class 1, 2, 3 and MC Supports bolting | SNS, SRE, SSR | Stainless steel (bolted connections) | Air – outdoor | Loss of material | Structures Monitoring | III.B2-7<br>III.B4-7 (TP-6) | 3.5.1-50 | A |
| Structural bolting | SNS, SRE, SSR | Carbon steel (bolted connections) | Air – indoor uncontrolled | Loss of material | Structures Monitoring | III.B2-10<br>III.B3-7<br>III.B4-10<br>III.B5-7 (T-30) | 3.5.1-39 | A |
| Structural bolting | SNS, SRE, SSR | Carbon steel (bolted connections) | Air – outdoor | Loss of material | Structures Monitoring | III.B2-10<br>III.B3-7<br>III.B4-10<br>III.B5-7 (T-30) | 3.5.1-39 | A |

**Table 3.5.2-4: Bulk Commodities**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Structural bolting | SNS, SRE, SSR | Carbon steel (bolted connections) | Air with borated water leakage | Loss of material | Boric Acid Corrosion Prevention | III.B2-11<br>III.B3-8<br>III.B4-11<br>III.B5-8<br>(T-25) | 3.5.1-55 | A |
| Structural bolting | SNS, SRE, SSR | Carbon steel (bolted connections) | Exposed to fluid environment | Loss of material | Structures Monitoring | III.A6-11<br>(T-21) | 3.5.1-47 | E |
| Structural bolting | SNS, SRE, SSR | Galvanized steel (bolted connections) | Air – indoor uncontrolled | None | None | III.B2-5<br>III.B3-3<br>III.B4-5<br>III.B5-3<br>(TP-11) | 3.5.1-58 | A |
| Structural bolting | SNS, SRE, SSR | Galvanized steel (bolted connections) | Air with borated water leakage | Loss of material | Boric Acid Corrosion Prevention | III.B2-6<br>III.B3-4<br>III.B4-6<br>III.B5-4<br>(TP-3) | 3.5.1-55 | A |
| Structural bolting | SNS, SRE, SSR | Galvanized steel (bolted connections) | Air – outdoor | Loss of material | Structures Monitoring | III.B2-7<br>III.B4-7<br>(TP-6) | 3.5.1-50 | A |

**Table 3.5.2-4: Bulk Commodities**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Structural bolting | SNS, SRE, SSR | Stainless steel (bolted connections) | Air – indoor uncontrolled | None | None | III.B2-8<br>III.B3-5<br>III.B4-8<br>III.B5-5 (TP-5) | 3.5.1-59 | A |
| Structural bolting | SNS, SRE, SSR | Stainless steel (bolted connections) | Air – outdoor | Loss of material | Structures Monitoring | III.B2-7<br>III.B4-7 (TP-6) | 3.5.1-50 | A |
| Equipment pads/ foundations | SNS, SRE, SSR | Concrete | Air – indoor uncontrolled | None | Structures Monitoring | | | I, 501 |
| Equipment pads/ foundations | SNS, SRE, SSR | Concrete | Air – outdoor | None | Structures Monitoring | | | I, 501 |
| Fire proofing | FB | Pyrocrete | Air – indoor uncontrolled | None | Structures Monitoring<br>Fire Protection | | | I, 501 |
| Manways, hatches and hatch covers | FB, FLB, PB, SNS, SRE, SSR | Concrete | Air – indoor uncontrolled | None | Structures Monitoring<br>Fire Protection | | | I, 501 |
| Missile shields | MB | Concrete | Air – indoor uncontrolled | None | Structures Monitoring | | | I, 501 |
| Missile shields | MB | Concrete | Air – outdoor | None | Structures Monitoring | | | I, 501 |

**Table 3.5.2-4: Bulk Commodities**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Support pedestals | SNS, SRE, SSR | Concrete | Air – indoor uncontrolled | None | Structures Monitoring | | | I, 501 |
| Support pedestals | SNS, SRE, SSR | Concrete | Air – outdoor | None | Structures Monitoring | | | I, 501 |
| Support pedestals | SNS, SRE, SSR | Concrete | Exposed to fluid environment | Loss of material | Structures Monitoring | III. A6-7 (T-20) | 3.5.1-45 | E |
| Fire barrier penetration seal | EN, FB, PB | Elastomer | Air – indoor uncontrolled | Cracking<br>Change in material properties | Fire Protection | VII G-1 (A-19) | 3.3.1-61 | B |
| Fire stops | FB | Cera blanket, mineral wool | Air – indoor uncontrolled | Cracking/ delamination<br>Separation | Fire Protection | | | J |
| Fire wrap | FB | Cerafiber, cera blanket | Air – indoor uncontrolled | Loss of material | Fire Protection | | | J |
| Insulation | INS, SNS | Fiberglass/ calcium silicate | Air – indoor uncontrolled | None | None | | | J, 502 |
| Seals and gaskets (floors, doors, manways and hatches) | PB, SSR | Elastomers | Air – indoor uncontrolled | Cracking<br>Change in material properties | Structures Monitoring | III.A6-12 (TP-7) | 3.5.1-44 | C |

**Table 3.5.2-4: Bulk Commodities**

| Structure and/ or Component or Commodity | Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Water stops | FLB | Elastomers | Air – indoor uncontrolled | None | None | | | J |

# 3.6 ELECTRICAL AND INSTRUMENTATION AND CONTROLS

## 3.6.1 Introduction

This section provides the results of the aging management review for electrical components which are subject to aging management review. Consistent with the methods described in NEI 95-10, the electrical and I&C aging management reviews focus on commodity groups rather than systems. The following electrical commodity groups requiring aging management review are addressed in this section.

- high-voltage insulators
- insulated cables and connections
- metal-enclosed bus
- switchyard bus and connections
- transmission conductors and connections
- direct burial 138kv insulated transmission cables

Table 3.6.1, Summary of Aging Management Programs for Electrical Components Evaluated in Chapter VI of NUREG-1801, provides the summary of the programs evaluated in NUREG-1801 for the electrical and I&C components. This table uses the format described in the introduction to Section 3. Hyperlinks are provided to the program evaluations in Appendix B.

## 3.6.2 Results

Table 3.6.2-1, Electrical and I&C (EIC) Components-Summary of Aging Management Evaluation, summarizes the results of aging management reviews and the NUREG-1801 comparison for electrical and I&C components.

### 3.6.2.1 Materials, Environments, Aging Effects Requiring Management, and Aging Management Programs

The following sections list the materials, environments, aging effects requiring management, and aging management programs for electrical and I&C components subject to aging management review. Programs are described in Appendix B. Further details are provided in the system tables.

**Materials**

Electrical and I&C components subject to aging management review are constructed of the following materials.

- aluminum
- cement
- copper and copper alloys
- galvanized metals
- insulation material (various organic polymers)

- porcelain
- steel and steel alloys
- various metals used for electrical connections

**Environment**

Electrical and I&C components subject to aging management review are exposed to the following environments.

- air with borated water leakage
- heat and air
- moisture and air
- moisture and voltage stress
- outdoor weather
- radiation and air
- soil

**Aging Effects Requiring Management**

The following aging effects associated with electrical and I&C components require management.

- loosening of bolted connections
- loss of circuit continuity
- loss of material
- reduced insulation resistance (IR)

**Aging Management Programs**

The following aging management programs will manage the effects of aging on electrical and I&C components.

- Boric Acid Corrosion Prevention
- Metal-Enclosed Bus Inspection
- Non-EQ Bolted Cable Connections
- Non-EQ Inaccessible Medium-Voltage Cable
- Non-EQ Instrumentation Circuits Test Review
- Non-EQ Insulated Cables And Connections

### 3.6.2.2 Further Evaluation of Aging Management as Recommended by NUREG-1801

NUREG-1801 indicates that further evaluation is necessary for certain aging effects and other issues discussed in Section 3.6.2.2 of NUREG-1800. The following sections are numbered corresponding to the discussions in NUREG-1800 and explain the IPEC approach to these areas requiring further evaluation. Programs are described in Appendix B.

#### 3.6.2.2.1 Electrical Equipment Subject to Environmental Qualification

Environmental qualification (EQ) analyses of electrical equipment are TLAAs as defined in 10 CFR 54.3. TLAAs are evaluated in accordance with 10 CFR 54.21(c). The evaluation of EQ TLAA is addressed in Section 4.4.

#### 3.6.2.2.2 Degradation of Insulator Quality due to Presence of Any Salt Deposits and Surface Contamination, and Loss of Material due to Mechanical Wear

The discussion in NUREG-1800 concerns effects of these aging mechanisms on high-voltage insulators.

The insulators evaluated for IPEC license renewal are those used to support uninsulated, high-voltage electrical components such as overhead transmission conductors and switchyard buses. The high voltage insulators support conductors for the recovery of offsite power following SBO.

The Unit 2 path includes transmission conductors (overhead and underground) and switchyard bus located between the switchyard breakers and the station auxiliary transformer. The Unit 3 path includes overhead transmission conductors and switchyard bus between the switchyard breakers and the station auxiliary transformer. High voltage insulators associated with these paths are subject to aging management review.

Various airborne materials such as dust, salt and industrial effluents can contaminate insulator surfaces. A large buildup of contamination enables the conductor voltage to track along the surface more easily and can lead to insulator flashover. Surface contamination can be a problem in areas where there are greater concentrations of airborne particles, such as near facilities that discharge heavy pollutants or near the seacoast where salt spray is prevalent. The buildup of surface contamination is gradual and in most areas washed away by rain. The glazed and coated insulator surface aids this contamination removal. IPEC is not located near the seacoast where salt spray is considered, nor is IPEC located near a facility that discharges heavy pollutants. Plant operating experience does not identify any issues associated with the buildup of surface contamination on the high voltage insulators. In addition, this area normally receives moderate rainfall, and any gradual buildup is washed away by rain. Although abnormal weather conditions may affect insulators, these are event-driven effects, not age-related effects. Surface contamination is not a significant aging effect for IPEC high-voltage insulators, so it is not an aging effect requiring management.

Mechanical wear is a potential aging effect for strain and suspension insulators subject to movement. Although this mechanism is possible, industry experience has shown overhead transmission conductors do not normally swing. When subjected to a substantial wind, movement will subside after a short period. A review of IPEC operating experience determined that wear has not been apparent during routine inspections. Loss of material due to wear is not significant and will not cause a loss of intended function of the insulators. Therefore, loss of material is not an aging effect requiring management for insulators.

There are no aging effects requiring management for IPEC high-voltage insulators.

#### 3.6.2.2.3 Loss of Material due to Wind Induced Abrasion and Fatigue, Loss of Conductor Strength due to Corrosion, and Increased Resistance of Connection due to Oxidation or Loss of Pre-load

Overhead transmission conductors are uninsulated, stranded electrical cables used outside buildings in high-voltage applications. The transmission conductor commodity group includes the associated fastening hardware but excludes the high-voltage insulators. Major active equipment assemblies include their associated transmission conductor terminations.

Overhead transmission conductors are subject to aging management review if they are necessary for recovery of offsite power following an SBO. At IPEC, overhead transmission conductors located between the switchyard breaker and station auxiliary transformers support recovery of offsite power following an SBO. Other overhead transmission conductors are not subject to aging management review since they do not perform a license renewal intended function.

Wind loading can cause overhead transmission conductor vibration, or sway. Consideration is given to wind loading during the design and installation phase. Loss of material that could be caused by overhead transmission conductor vibration or sway is not a significant aging effect in that it would not cause a loss of intended function if left unmanaged for the extended period of operation. The effects of wind loading and vibration on strain and suspension insulators are discussed in Section 3.6.2.2.2.

The most prevalent mechanism contributing to loss of conductor strength of an aluminum conductor steel reinforced (ACSR) transmission conductor is corrosion, which includes corrosion of the steel core and aluminum strand pitting. Corrosion in ACSR conductors is a very slow-acting mechanism, and the corrosion rates depend largely on air quality, which includes suspended particles chemistry, $SO_2$

concentration in air, precipitation, fog chemistry, and meteorological conditions. Air quality in rural areas generally contains low concentrations of suspended particles and $SO_2$, which keeps the corrosion rate to a minimum. Although IPEC is located near urban areas there are no other industries in the immediate rural area. Tests performed by Ontario Hydroelectric showed a 30 percent loss of composite conductor strength of an 80-year-old ACSR conductor due to corrosion.

There is a set percentage of composite conductor strength established at which an ACSR transmission conductor is replaced. As illustrated below, there is ample strength margin to maintain the transmission conductor intended function through the period of extended operation.

The National Electrical Safety Code (NESC) requires that tension on installed conductors be a maximum of 60 percent of the ultimate conductor strength. The NESC also sets the maximum tension a conductor must be designed to withstand under heavy load requirements, which includes consideration of ice, wind and temperature. The aging management review of the IPEC transmission conductors reviewed these specific attributes.

The IPEC transmission conductors subject to aging management review were bounded by the Ontario Hydro test population. The IPEC transmission conductors have an ultimate strength margin greater than the Ontario Hydro test cables after 80 years of service. The installed configuration at IPEC is representative of the tested samples, so the conclusions in the Ontario Hydro study are valid for IPEC. Therefore, loss of conductor strength due to corrosion of the transmission conductors in not significant and is not an aging effect requiring management for the period of extended operation.

The design of the transmission conductor bolted connections precludes torque relaxation, and the IPEC plant-specific operating experience supports this statement, since plant operating experience has not identified any failures of switchyard connections due to aging. The typical design of switchyard bolted connections includes Belleville washers. The bolted connections and washers are coated with an anti-oxidant compound (a grease-type sealant) prior to tightening the connection to prevent the formation of oxides on the metal surface and to prevent moisture from entering the connection, thus reducing the chances of corrosion. Based on operating experience, this method of installation has been shown to provide a corrosion-resistant, low-electrical-resistance connection. The type of bolting plate and the use of Bellville washers is the industry standard to preclude torque relaxation. IPEC design incorporates the use of Belleville washers on bolted electrical connections of dissimilar metals to compensate for temperature changes, maintain the proper torque and prevent loosening. This method of assembly is consistent with the good bolting practices recommended by industry guidelines. Combined with the proper sizing of the conductors, this assembly virtually eliminates the need to consider this aging mechanism; therefore, there will be no significant aging. These transmission connections are included in the infrared predictive maintenance of the 138 kV switchyard, which verifies the effectiveness of the connection design and installation practices. The infrared predictive maintenance is performed at least once every year. Based on this discussion, loosening of bolted connections for transmission conductors is not an aging effect requiring management.

There are no aging effects requiring management for transmission conductors or connectors.

Switchyard bus is uninsulated, un-enclosed, rigid electrical conductors used in medium- and high-voltage applications. Switchyard bus includes the hardware used to secure the bus to high-voltage insulators. Switchyard bus establishes electrical connections to disconnect switches, switchyard breakers, and transformers. The IPEC switchyard bus between the switchyard breakers and the station auxiliary transformers support recovery of offsite power following SBO event and is therefore subject to aging management review. Switchyard bus outside the path of offsite power recovery does not require aging management review since it does not perform a license renewal intended function.

The switchyard bus subject to aging management review is constructed of rigid aluminum pipe. The switchyard bus is connected to short lengths of flexible conductors to minimize vibration from supports and active components such as circuit breakers. Based on this design configuration, wind induced vibration is not a significant aging mechanism. The bolted connections associated with the switchyard bus are for the connections to station post insulators used to support the bus. All other connections to the bus are welded. The components involved in switchyard bus connections are constructed from aluminum, galvanized steel and stainless steel. No organic materials are involved.

With no rigid connections to moving or vibrating equipment, loss of material due to vibration is not a significant aging effect requiring management. Aluminum bus exposed to the service conditions of the IPEC 138kV switchyards does not experience any appreciable aging effects, except for minor oxidation, which does not impact the ability of the switchyard bus to perform its intended function. Therefore, it is concluded that general corrosion resulting in the oxidation of the switchyard bus is not an aging effect requiring management.

Connection surface oxidation and loosening of bolted connections for aluminum switchyard bus is not applicable since the switchyard bus connections requiring aging management review are welded connections. However, the flexible conductors, which are welded to the switchyard bus, are bolted to the other switchyard components. These switchyard component connections are also included in the infrared predictive maintenance of the 138 kV switchyard, which verifies the effectiveness of the connection design and installation practices. The infrared predictive maintenance is performed at least once every year. Flexible conductors are included in the switchyard bus commodity. These flexible conductor bolted connections are assembled similar to the transmission conductor bolted connections discussed previously in this section. For environmental conditions at IPEC, no significant aging has been identified that could cause a loss of intended function for the period of extended operation. Vibration is not applicable since flexible connectors connect switchyard bus to active components.

Although not specifically stated, the switchyard connections requiring aging management review are welded and bolted connections. Neither of these connection types require aging management, because the loosening of bolted connections is not a significant aging effect.

Connection surface oxidation for aluminum switchyard bus is not applicable since switchyard bus connections requiring aging management review are welded connections. For ambient environmental conditions at IPEC, no aging effects have been identified that could cause a loss of intended function for the period of extended operation. Vibration is not applicable since flexible connectors connect switchyard bus.

There are no aging effects requiring management for aluminum switchyard bus or connections.

#### 3.6.2.2.4 Quality Assurance for Aging Management of Nonsafety-Related Components

See Appendix B Section B.0.3 for discussion of IPEC quality assurance procedures and administrative controls for aging management programs.

### 3.6.2.3 Time-Limited Aging Analysis

The only TLAAs identified for the electrical and I&C commodity components are evaluations for EQ. The EQ TLAA is evaluated in Section 4.4.

## 3.6.3 Conclusion

The electrical and I&C components that are subject to aging management review have been identified in accordance with the requirements of 10 CFR 54.21(a)(1). The aging management programs selected to manage aging effects for the electrical and I&C components are identified in Section 3.6.2.1 and in the following tables. A description of aging management programs is provided in Appendix B of this application, along with the demonstration that the identified aging effects will be managed for the period of extended operation.

Based on the demonstrations provided in Appendix B, the effects of aging associated with electrical and I&C components will be managed such that there is reasonable assurance the intended functions will be maintained consistent with the current licensing basis during the period of extended operation.

## Table 3.6.1
## Summary of Aging Management Programs for the Electrical and I&C Components Evaluated in Chapter VI of NUREG-1801

**Table 3.6.1: Electrical Components, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.6.1-1 | Electrical equipment subject to 10 CFR 50.49 environmental qualification (EQ) requirements | Degradation due to various aging mechanisms | Environmental Qualification of Electric Components | Yes, TLAA | EQ equipment is not subject to aging management review because replacement is based on qualified life. EQ analyses are evaluated as TLAAs in Section 4.4. |
| 3.6.1-2 | Electrical cables, connections and fuse holders (insulation) not subject to 10 CFR 50.49 EQ requirements | Reduced insulation resistance (IR) and electrical failure due to various physical, thermal, radiolytic, photolytic and chemical mechanisms | Electrical Cables and Connections Not Subject to 10 CFR 50.49 EQ Requirements | No | Consistent with NUREG-1801. The Non-EQ Insulated Cables And Connections Program will manage the effects of aging. This program includes inspection of non-EQ electrical and I&C penetration cables and connections. |
| 3.6.1-3 | Conductor insulation for electrical cables and connections used in instrumentation circuits not subject to 10 CFR 50.49 EQ requirements that are sensitive to reduction in conductor insulation resistance (IR) | Reduced insulation resistance (IR) and electrical failure due to various physical, thermal, radiolytic, photolytic and chemical mechanisms | Electrical Cables and Connections used in Instrumentation Circuits Not Subject to 10 CFR 50.49 EQ Requirements | No | Consistent with NUREG-1801. The Non-EQ Instrumentation Circuits Test Review Program will manage the effects of aging. This program includes review of calibration and surveillance testing results of instrumentation circuits. |

**Table 3.6.1: Electrical Components, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.6.1-4 | Conductor insulation for inaccessible medium-voltage (2kV to 35kV) cables (e.g., installed in conduit or direct buried) not subject to 10 CFR 50.49 EQ requirements | Localized damage and breakdown of insulation leading to electrical failure due to moisture intrusion, water trees | Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 EQ Requirements | No | Consistent with NUREG-1801. The Non-EQ Inaccessible Medium-Voltage Cable Program will manage the effects of aging. This program includes inspection of medium-voltage cables exposed to significant moisture and voltage and testing as required.<br>In Table 3.6.2-1, reduced insulation resistance (IR) is considered equivalent to the aging effect listed for this item (breakdown of insulation). |
| 3.6.1-5 | Connector contacts for electrical connectors exposed to borated water leakage | Corrosion of connector contact surfaces due to intrusion of borated water | Boric Acid Corrosion | No | Consistent with NUREG-1801. The Boric Acid Corrosion Prevention Program will manage the effects of aging. This program includes periodic visual inspection of adjacent structures, components, and supports for evidence of leakage and corrosion.<br>In Table 3.6.2-1, loss of circuit continuity is the aging effect resulting from corrosion of connector contact surfaces. |

**Table 3.6.1: Electrical Components, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.6.1-6 | Fuse holders (not part of a larger assembly) - metallic clamp | Fatigue due to ohmic heating, thermal cycling, electrical transients, frequent manipulation, vibration, chemical contamination, corrosion, and oxidation | Fuse Holders | No | NUREG-1801 aging effects are not applicable to IPEC. A review of IPEC documents indicated that fuse holders utilizing metallic clamps are either part of an active device or located in circuits that perform no intended function. Therefore, fuse holders with metallic clamps at IPEC are not subject to aging management review. |
| 3.6.1-7 | Metal enclosed bus – Bus / connections | Loosening of bolted connections due to thermal cycling and ohmic heating | Metal Enclosed Bus | No | Consistent with NUREG-1801. The Metal-Enclosed Bus Inspection Program will manage the effects of aging. This program includes thermography of the exterior of the MEG and visual inspection of interior portions of the bus. |
| 3.6.1-8 | Metal enclosed bus – insulation / insulators | Reduced insulation resistance and electrical failure due to various physical, thermal, radiolytic, photolytic, and chemical mechanisms | Metal Enclosed Bus | No | Consistent with NUREG-1801. The Metal-Enclosed Bus Inspection Program will manage the effects of aging. This program includes visual inspection of interior portions of the bus.<br>In Table 3.6.2-1, reduced insulation resistance (IR) is considered equivalent to the aging effect listed for this item. |

**Table 3.6.1: Electrical Components, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.6.1-9 | Metal enclosed bus – enclosure assemblies | Loss of material due to general corrosion | Structures Monitoring Program | No | Not consistent with NUREG-1801. The Metal-Enclosed Bus Inspection Program will manage the effects of aging through visual inspection. |
| 3.6.1-10 | Metal enclosed bus – enclosure assemblies | Hardening and loss of strength / elastomers degradation | Structures Monitoring Program | No | NUREG-1801 aging effects are not applicable to IPEC.<br>The only elastomers associated with the IPEC metal enclosed bus are access door gaskets, which are considered consumables. Therefore, there are no aging effects that require management. |
| 3.6.1-11 | High voltage insulators | Degradation of insulation quality due to presence of any salt deposits and surface contamination; loss of material caused by mechanical wear due to wind blowing on transmission conductors | Plant specific | Yes, plant specific | NUREG-1801 aging effects are not applicable to IPEC. See Section 3.6.2.2.2 for further evaluation. |

**Table 3.6.1: Electrical Components, NUREG-1801 Vol. 1**

| Item Number | Component | Aging Effect/ Mechanism | Aging Management Programs | Further Evaluation Recommended | Discussion |
|---|---|---|---|---|---|
| 3.6.1-12 | Transmission conductors and connections; switchyard bus and connections | Loss of material due to wind induced abrasion and fatigue; loss of conductor strength due to corrosion; increased resistance of connection due to oxidation or loss of preload | Plant specific | Yes, plant specific | NUREG-1801 aging effects are not applicable to IPEC. See Section 3.6.2.2.3 for further evaluation. |
| 3.6.1-13 | Cable connections metallic parts | Loosening of bolted connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation | Electrical Cable Connections not Subject to 10 CFR 50.49 Environmental Qualification Requirements | No | IPEC is providing a plant-specific one-time inspection program (Non-EQ Bolted Cable Connections Program) as an alternate to the NUREG-1801 XI.E6 program. This one-time inspection program will verify the absence of aging effects requiring management. |
| 3.6.1-14 | Fuse holders (not part of a larger assembly) – insulation material | None | None | NA – No AEM or AMP | Consistent with NUREG-1801. |

## Notes for Tables 3.6.2-1

Generic notes

A Consistent with NUREG-1801 item for component, material, environment, aging effect and aging management program. AMP is consistent with NUREG-1801 AMP.

B. Consistent with NUREG-1801 item for component, material, environment, aging effect and aging management program. AMP has exceptions to NUREG-1801 AMP.

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

D. Component is different, but consistent with NUREG-1801 item for material, environment, aging effect and aging management program. AMP has exceptions to NUREG-1801 AMP.

E. Consistent with NUREG-1801 material, environment, and aging effect but a different aging management program is credited.

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.

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

J. Neither the component nor the material and environment combination is evaluated in NUREG-1801.

Plant-specific notes

601. Based on the NEI-NRC meeting on November 30, 2006, to discuss the NUREG-1801 XI.E6 program, IPEC will implement a plant-specific one-time inspection program prior to the period of extended operation to verify the absence of aging effects requiring management.

602. Based on vendor information, this transmission cable is not subject to water treeing, since it is designed for continuously wet conditions. Industry and plant operating experience has not provided any information on failures of this type of cable.

# Table 3.6.2-1
# Electrical Components
# Summary of Aging Management

**Table 3.6.2-1: Electrical Components**

| Component Type | Component Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Cable connections (metallic parts) | CE | Various metals used for electrical connections | Heat and air<br>Moisture and air<br>Radiation and air | Loosening of bolted connections | Non-EQ Bolted Cable Connections | VI.A-1 (LP-12) | 3.6.1-13 | E, 601 |
| Electrical connections not subject to 10 CFR 50.49 EQ requirements | CE | Various metals used for electrical connections | Air with borated water leakage | Loss of circuit continuity | Boric Acid Corrosion Prevention | VI.A-5 (L-04) | 3.6.1-5 | A |
| Electrical cables and connections and fuse holders (insulation) not subject to 10 CFR 50.49 EQ requirements (includes non-EQ electrical and I&C penetration conductors and connections) | CE | Insulation material (various organic polymers) | Heat and air<br>Moisture and air<br>Radiation and air | Reduced insulation resistance (IR) | Non-EQ Insulated Cables And Connections | VI.A-2 (L-01)<br>VI.A-6 (LP-03) | 3.6.1-2 | A |

**Table 3.6.2-1: Electrical Components**

| Component Type | Component Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Electrical cables not Subject To 10 CFR 50.49 EQ requirements used in instrumentation circuits | CE | Insulation material (various organic polymers) | Heat and air<br>Moisture and air<br>Radiation and air | Reduced insulation resistance (IR) | Non-EQ Instrumentation Circuits Test Review | VI.A-3 (L-02) | 3.6.1-3 | A |
| Fuse holders (insulation material) | CE | Insulation material (various organic polymers) | Heat and air<br>Moisture and air<br>Radiation and air | None | None | VI.A-7 (LP-02) | 3.6.1-14 | A |
| High voltage insulators for SBO recovery | IN | Porcelain, galvanized metal, cement | Outdoor weather | None | None | VI.A-10 (LP-11) | 3.6.1-11 | I |
| Inaccessible medium-voltage (2kV to 35kV) cables (e.g., installed underground in conduit or direct buried) not subject to 10 CFR 50.49 EQ requirements | CE | Insulation material (various organic polymers) | Moisture and voltage stress | Reduced insulation resistance (IR) | Non-EQ Inaccessible Medium-Voltage Cable | VI.A-4 (L-03) | 3.6.1-4 | A |

**Table 3.6.2-1: Electrical Components**

| Component Type | Component Intended Function | Material | Environment | Aging Effect Requiring Management | Aging Management Programs | NUREG-1801 Vol. 2 Item | Table 1 Item | Notes |
|---|---|---|---|---|---|---|---|---|
| Metal enclosed bus (non-segregated for SBO recovery), bus and connections | CE | Aluminum, copper, steel | Heat and air<br>Outdoor weather | Loosening of bolted connections | Metal-Enclosed Bus Inspection | VI.A-11 (LP-04) | 3.6.1-7 | A |
| Metal enclosed bus (non-segregated for SBO recovery), insulation / insulators | IN | Porcelain, galvanized metals | Heat and air<br>Outdoor weather | Reduced insulation resistance (IR) | Metal-Enclosed Bus Inspection | VI.A-14 (LP-05) | 3.6.1-8 | A |
| Metal enclosed bus (non-segregated for SBO recovery) enclosure assemblies | SRE | Steel | Heat and air<br>Outdoor weather | Loss of material | Metal-Enclosed Bus Inspection | VI.A-13 (LP-06) | 3.6.1-9 | E |
| Metal enclosed bus (non-segregated for SBO recovery) enclosure assemblies | SRE | Elastomers | Heat and air<br>Outdoor weather | None | None | VI.A-12 (LP-10) | 3.6.1-10 | I |
| Switchyard bus and connections for SBO recovery | CE | Aluminum, copper | Outdoor weather | None | None | VI.A-15 (LP-9) | 3.6.1-12 | I |
| Transmission conductors and connections for SBO recovery | CE | Aluminum, steel, steel alloy | Outdoor weather | None | None | VI.A-16 (LP-08) | 3.6.1-12 | I |

| **Table 3.6.2-1: Electrical Components** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Component Type** | **Component Intended Function** | **Material** | **Environment** | **Aging Effect Requiring Management** | **Aging Management Programs** | **NUREG-1801 Vol. 2 Item** | **Table 1 Item** | **Notes** |
| 138kV direct burial insulated transmission cables (passive electrical for SBO recovery) | CE | Insulation material – various organic polymers | Outdoor weather<br>Soil | None | None | | | J, 602 |

# 4.0 TIME-LIMITED AGING ANALYSES

## 4.1 IDENTIFICATION OF TIME-LIMITED AGING ANALYSES

Time-limited aging analyses are defined in 10 CFR 54.3.

> *Time-limited aging analyses*, for the purposes of this part, are those licensee calculations and analyses that:
>
> (1) Involve systems, structures, and components within the scope of license renewal, as delineated in §54.4(a);
>
> (2) Consider the effects of aging;
>
> (3) Involve time-limited assumptions defined by the current operating term, for example, 40 years;
>
> (4) Were determined to be relevant by the licensee in making a safety determination;
>
> (5) Involve conclusions or provide the basis for conclusions related to the capability of the system, structure, and component to perform its intended functions, as delineated in §54.4(b); and
>
> (6) Are contained or incorporated by reference in the CLB.

Section 10 CFR 54.21(c) requires a list of time-limited aging analyses (TLAA) as part of the application for a renewed license. Section 10 CFR 54.21(c)(2) requires a list of current exemptions to 10 CFR 50 based on TLAA as part of the application for a renewed license.

> §54.21 Contents of application — technical information.
>
> (c) An evaluation of time-limited aging analyses.
>
> (1) A list of time-limited aging analyses, as defined in §54.3, must be provided. The applicant shall demonstrate that—
>
> (i) The analyses remain valid for the period of extended operation;
>
> (ii) The analyses have been projected to the end of the period of extended operation; or
>
> (iii) The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.
>
> (2) A list must be provided of plant-specific exemptions granted pursuant to 10 CFR 50.12 and in effect that are based on time-limited aging analyses as defined in §54.3. The applicant shall provide an evaluation that justifies the continuation of these exemptions for the period of extended operation.

### 4.1.1 Identification of TLAA

The process used to identify the time-limited aging analyses is consistent with the guidance provided in NEI 95-10, *Industry Guidelines for Implementing the Requirements of 10 CFR 54 – The License Renewal Rule*, Revision 6, June 2005. Calculations and analyses that potentially meet the definition of 10 CFR 54.3 were identified by searching CLB documents including the following.

- Technical Specifications and Bases
- UFSAR
- Technical Requirements Manual
- Westinghouse Commercial Atomic Power (WCAP) topical reports referenced in the UFSAR and in licensing correspondence with the NRC
- docketed licensing correspondence
- Fire Protection Program documents
- NRC safety evaluation reports
- ASME Section XI Inservice Inspection program

Industry documents that list generic time-limited aging analyses were also reviewed to provide additional assurance of the completeness of the plant-specific list. These documents included NEI 95-10; NUREG-1800, *Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants*, Revision 1, September 2005; NUREG-1801, *Generic Aging Lessons Learned (GALL) Report*, Revision 1, September 2005; and NRC safety evaluation reports related to license renewal applications by other PWR licensees.

Table 4.1-1 and Table 4.1-2 provide a summary listing of the TLAAs.

### 4.1.2 Identification of Exemptions

IPEC exemptions were identified by searching CLB documents including the following.

- Technical Specifications
- UFSAR (IP2 and IP3)
- Fire Protection Program Documents
- NRC Correspondence

No IPEC exemptions are based on time-limited aging analyses.

## Table 4.1-1
## List of IP2 TLAA and Resolution

| TLAA Description | Resolution Option | Section |
|---|---|---|
| **Reactor Vessel Neutron Embrittlement Analyses** | | |
| Charpy upper-shelf energy | Analyses projected<br>10 CFR 54.21(c)(1)(ii) | 4.2.2 |
| Pressure/temperature limits | P-T limit curves managed<br>10 CFR 54.21(c)(1)(iii) | 4.2.3 |
| Low temperature overpressure protection (LTOP) | LTOP limits managed<br>10CFR54.21(c)(1)(iii) | 4.2.4 |
| Pressurized thermal shock | Analysis projected<br>10 CFR 54.21(c)(1)(ii) | 4.2.5 |
| **Metal Fatigue Analyses** | | |
| Reactor vessel | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.3.1.1 |
| Reactor vessel internals | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.3.1.2 |
| Pressurizer | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.3.1.3 |
| Pressurizer insurge/outsurge transients | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.3.1.3 |
| Steam generator | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.3.1.4 |
| Reactor coolant pump | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.3.1.5 |
| Control rod drive mechanisms | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.3.1.6 |
| Regenerative letdown heat exchanger | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.3.1.7 |
| Class 1 piping and in-line components—ANSI B31.1 piping | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.3.1.8 |
| Class 1 piping and in-line components—pressurizer surge line | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.3.1.8 |

## Table 4.1-1
## List of IP2 TLAA and Resolution (Continued)

| TLAA Description | Resolution Option | Section |
|---|---|---|
| Class 1 piping and in-line components—thermowells | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.3.1.8 |
| Class 1 piping and in-line components—charging system | Analysis will be updated as part of environmental fatigue evaluation. See Section 4.3.3. | 4.3.1.8 |
| Class 1 piping and in-line components—loop 3 accumulator nozzle | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.3.1.8 |
| Non-Class 1 piping and in-line components | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.3.2 |
| Non-Class 1, non-piping components - residual heat removal heat exchanger | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.3.2 |
| Effects of reactor water environment on fatigue life | Analyses remain valid<br>10 CFR 54.21(c)(1)(i)<br>OR<br>Aging effect managed<br>10 CFR 54.21(c)(1)(iii) | 4.3.3 |
| **Environmental Qualification Analyses Of Electrical Equipment** | Aging effect managed<br>10 CFR 54.21(c)(1)(iii) | 4.4 |
| **Concrete Containment Tendon Prestress Analyses** | IPEC does not have pre-stressed tendons in the containment structures. | 4.5 |
| **Containment Liner Plate and Penetrations Fatigue Analyses** | | |
| Containment penetration (feedwater line #22) fatigue analysis | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.6 |
| **Other TLAA** | | |
| Leak before break | Analysis remains valid<br>10 CFR 54.21(c)(1)(i) | 4.7.2 |
| Steam generator flow-induced vibration (tube wear) | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.7.3 |

## Table 4.1-2
## List of IP3 TLAA and Resolution

| TLAA Description | Resolution Option | Section |
|---|---|---|
| **Reactor Vessel Neutron Embrittlement Analyses** | | |
| Charpy upper-shelf energy | Analyses projected 10 CFR 54.21(c)(1)(ii) | 4.2.2 |
| Pressure/temperature limits | P-T limit curves managed 10 CFR 54.21(c)(1)(iii) | 4.2.3 |
| Low temperature overpressure protection (LTOP) | LTOP limits managed 10CFR54.21(c)(1)(iii) | 4.2.4 |
| Pressurized thermal shock | Aging effects managed 10 CFR 54.21(c)(1)(iii) | 4.2.5 |
| **Metal Fatigue Analyses** | | |
| Reactor vessel | Analysis remains valid 10 CFR 54.21(c)(1)(i) | 4.3.1.1 |
| Reactor vessel internals | Analysis remains valid 10 CFR 54.21(c)(1)(i) | 4.3.1.2 |
| Pressurizer | Analysis remains valid 10 CFR 54.21(c)(1)(i) | 4.3.1.3 |
| Pressurizer insurge/outsurge transients | Analysis remains valid 10 CFR 54.21(c)(1)(i) | 4.3.1.3 |
| Steam generator | Analysis remains valid 10 CFR 54.21(c)(1)(i) | 4.3.1.4 |
| Reactor coolant pump | Analyses remain valid 10 CFR 54.21(c)(1)(i) | 4.3.1.5 |
| Control rod drive mechanisms | Analysis remains valid 10 CFR 54.21(c)(1)(i) | 4.3.1.6 |
| Regenerative letdown heat exchangers | Analyses remain valid 10 CFR 54.21(c)(1)(i) | 4.3.1.7 |
| Class 1 piping and in-line components—ANSI B31.1 piping | Analysis remains valid 10 CFR 54.21(c)(1)(i) | 4.3.1.8 |
| Class 1 piping and in-line components —pressurizer surge line | Analysis remains valid 10 CFR 54.21(c)(1)(i) | 4.3.1.8 |

## Table 4.1-2
## List of IP3 TLAA and Resolution (Continued)

| TLAA Description | Resolution Option | Section |
|---|---|---|
| Class 1 piping and in-line components —thermowells | Analysis remains valid<br>10 CFR 54.21(c)(1)(i) | 4.3.1.8 |
| Class 1 piping and in-line components —charging system | Analysis will be updated as part of environmental fatigue evaluation. See Section 4.3.3. | 4.3.1.8 |
| Non-Class 1 piping and in-line components | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.3.2 |
| Non-Class 1, non-piping components—residual heat removal heat exchanger | Analyses remain valid<br>10 CFR 54.21(c)(1)(i) | 4.3.2 |
| Effects of reactor water environment on fatigue life | Analyses remain valid<br>10 CFR 54.21(c)(1)(i)<br>OR<br>Aging effect managed<br>10 CFR 54.21(c)(1)(iii) | 4.3.3 |
| **Environmental Qualification Analyses of Electrical Equipment** | Aging effect managed<br>10 CFR 54.21(c)(1)(iii) | 4.4 |
| **Concrete Containment Tendon Prestress Analyses** | IPEC does not have pre-stressed tendons in the containment structures. | 4.5 |
| **Containment Liner Plate and Penetrations Fatigue Analyses** | No TLAA for these components. | 4.6 |
| **Other TLAA** | | |
| Leak before break | Analysis remains valid<br>10 CFR 54.21(c)(1)(i) | 4.7.2 |
| Steam generator flow-induced vibration (tube wear) | Analyses projected<br>10 CFR 54.21(c)(1)(ii) | 4.7.3 |

## 4.2 REACTOR VESSEL NEUTRON EMBRITTLEMENT

The regulations governing reactor vessel integrity are in 10 CFR 50. Section 50.60 requires that all light-water reactors meet the fracture toughness, pressure-temperature limits, and material surveillance program requirements for the reactor coolant pressure boundary as set forth in 10 CFR 50 Appendices G and H.

The IPEC current licensing basis analyses evaluating reduction of fracture toughness of the reactor vessel for 40 years are TLAA. The reactor vessel neutron embrittlement TLAA for each unit is summarized below. Forty-eight effective full-power years (EFPY) are projected for the end of the period of extended operation (60 years) based on actual capacity factors from the start of commercial operation until 2005 and an average capacity factor of 95% from 2005 till the end of the period of extended operation.

### 4.2.1 Reactor Vessel Fluence

The neutron exposure levels for the reactor pressure vessels have been projected for an operating period extending to 48 EFPY. These calculations utilized discrete ordinates $\mathbf{S}_n$ transport analysis to determine the neutron radiation environment within the reactor pressure vessel and surveillance capsules.

Unit 2

In the evaluation, fast neutron exposure parameters in terms of fast neutron fluence (E > 1.0 MeV) and iron atom displacements (dpa) were established on a plant and fuel cycle specific basis for the first sixteen reactor operating cycles (1973–2004). The fuel cycle designs analyzed in these calculations have been implemented. Also included in the calculation are analyses for three other cycle designs that were created as a part of the 2003 stretch power uprate study. Therefore, the 48 EFPY projections include the effects of stretch power uprate.

The projected 48 EFPY peak beltline fluence level of 1.906E+19 n/cm$^2$ (at the 45 degree azimuth position) is used for all beltline materials except axial welds. The beltline axial welds are located at 0, 15 and 30 degree azimuth positions. The maximum projected 48 EFPY peak fluence level for the beltline axial welds is 1.295E+19 n/cm$^2$ at the 30 degree azimuth position.

The ¼t fluence level is determined by applying Equation (3) of Regulatory Guide 1.99, based on a vessel thickness of 8.625" which yields a fluence of 7.72E+18 n/cm$^2$ for beltline axial welds and 1.136E+19 n/cm$^2$ for remaining beltline materials.

Unit 3

In the evaluation, fast neutron exposure parameters in terms of fast neutron fluence (E > 1.0 MeV) and iron atom displacements (dpa) were established on a plant and fuel cycle specific basis for the first thirteen reactor operating cycles (1976–2005). The fuel cycle designs analyzed in these calculations have been implemented. Also included in the calculation are analyses for three other cycle designs that were created as a part of the 2003 stretch power uprate study. Therefore, the 48 EFPY projections include the effects of stretch power uprate.

The projected 48 EFPY peak beltline fluence level of 1.560E +19 n/cm$^2$ (at the 45 degree azimuth position) is used for all beltline materials including axial welds.

The ¼t fluence level is determined by applying Equation (3) of Regulatory Guide 1.99, based on a vessel thickness of 8.625" which yields a fluence of 9.298E+18 n/cm$^2$.

### 4.2.2 Charpy Upper-Shelf Energy

The pressure-retaining components of the reactor coolant pressure boundary that are made of ferritic materials must meet the requirements of the ASME Code, supplemented by the additional requirements defined in Appendix G of 10 CFR 50, for fracture toughness during system hydrostatic tests and any condition of normal operation, including anticipated operational occurrences. For the reactor vessel beltline materials, the values of the reference temperature ($RT_{NDT}$) and Charpy upper-shelf energy must account for the effects of neutron radiation. The effects of neutron radiation must consider the fluence at the deepest point on the crack front of the flaw assumed in the analysis. Reactor vessel beltline materials must maintain Charpy upper-shelf energy throughout the life of the vessel of no less than 50 ft-lb.

Regulatory Guide 1.99 provides two methods (positions) for determining Charpy upper-shelf energy ($C_V$USE). Position 1 applies for material that does not have surveillance data available and Position 2 applies for material that does have surveillance data. For Position 1, the percent drop in $C_V$USE, for a stated copper content and neutron fluence, is determined by reference to Figure 2 of Regulatory Guide 1.99 in accordance with Regulatory Guide 1.99 Section 1.2. This percentage drop is applied to the initial $C_V$USE to obtain the adjusted $C_V$USE. For Position 2, the percent drop in $C_V$USE is determined by plotting the available data on Figure 2 and fitting the data with a line drawn parallel to the existing lines that bound all the plotted points in accordance with Regulatory Guide 1.99 Section 2.2.

Unit 2

The upper shelf energy (USE) values have been determined based on the maximum projected 48 EFPY beltline fluence shown in Section 4.2.1. The beltline region chemistry and surveillance data, including the un-irradiated $C_V$USE information, is from the RVID2 database and clarified in WCAP-15629, Revision 1. The projected 48 EFPY peak beltline fluence level at the clad/base metal interface of 1.906E+19 n/cm$^2$ was applied to all beltline materials except axial welds where the expected peak fluence is 1.295E+19 n/cm$^2$. The resulting projected 48 EFPY $C_V$USE drop and resulting ¼t $C_V$USE are shown in Table 4.2-1. One intermediate shell plate (B2002-3) and one lower shell plate (B2003-1) have projected upper shelf energy levels that fall below

50 ft-lb during the period of extended operation. All remaining plate and weld beltline materials exceed 50 ft-lb at 48 EFPY.

10 CFR Part 50, Appendix G, Section IV.A.1 requires licensees to take further corrective actions for cases where the 50 ft-lbs end-of-life USE criterion cannot be met (e.g., when the EOL USE falls below the USE value criterion specified in a previously NRC-approved EMA). As noted in Table 4.2-1, the lowest projected USE level for the IP2 beltline plate material through the period of extended operation is 47.4 ft-lb for intermediate shell plate B2002-3. An equivalent margins analysis performed in WCAP-13587, Rev. 1 demonstrated that the minimum acceptable USE for reactor vessel plate material in 4 loop plants such as IP2 is 43 ft-lbs. In the safety assessment of WCAP-13587, the NRC concluded the report demonstrated margins of safety equivalent to those of the ASME code for beltline plate and forging materials. The IP2 USE values are therefore acceptable since the IP2 lowest projected USE level for the IP2 beltline plate material through the period of extended operation of 47.4 ft-lb for intermediate shell plate B2002-3 is above the 43 ft-lbs minimum acceptable USE for 4 loop plants determined in WCAP-13587 Rev. 1. This determination is consistent with NUREG-1800, Section 4.2.2.1.1.2, and with the NRC Safety Evaluation Report of acceptable USE for H. B Robinson Unit 2 as documented in NUREG-1785. The TLAA for USE is projected through the period of extended operation in accordance with 10CFR54.21(c)(1)(ii).

Unit 3

The IPEC Unit 3 upper shelf energy values have been determined based on the maximum projected 48 EFPY beltline fluence and the beltline region chemistry and surveillance data including the un-irradiated $C_V$USE information as summarized in the RVID2 database. The projected 48 EFPY peak beltline fluence level at the clad/base metal interface of 1.560E+19 n/cm$^2$ was conservatively applied to all beltline materials. The 48 EFPY ¼t fluence level of 9.298E+18 n/cm$^2$ was calculated in accordance with Regulatory Guide 1.99, Equation (3) based on a vessel thickness of 8.625". The resulting projected 48 EFPY $C_V$USE drop and resulting ¼t $C_V$USE are displayed in Table 4.2-2. All plate and weld beltline materials exceed 50 ft-lb at 48 EFPY and an equivalent margins analysis is not required.

The TLAA for USE is projected through the period of extended operation in accordance with 10CFR54.21(c)(1)(ii)

## Table 4.2-1
## IP2 Charpy Upper-Shelf Energy Data for 48 Effective Full-Power Years (EFPY)

| Reactor Vessel Location (Beltline Identification) | Material Ident | Material Type | Heat # | Fluence Vessel Clad/BM 48 EFPY | Fluence 1/4T 48 EFPY | %Cu | Un-irradiated USE | %Drop in USE | 48 EFPY USE at 1/4T | RG 1.99 Position |
|---|---|---|---|---|---|---|---|---|---|---|
| Intermediate shell | B2002-1 | A302BM | B-4688-2 | 1.906E+19 | 1.136E+19 | 0.190 | 70 | 21.1% | 55.2 | 2.2 |
| Intermediate shell | B2002-2 | A302BM | B-4701-2 | 1.906E+19 | 1.136E+19 | 0.170 | 73 | 22.8% | 56.4 | 2.2 |
| Intermediate shell | B2002-3 | A302BM | B-4922-1 | 1.906E+19 | 1.136E+19 | 0.250 | 74 | 36.0% | 47.4 | 2.2 |
| Lower shell | B2003-1 | A302BM | B-4791-1 | 1.906E+19 | 1.136E+19 | 0.200 | 71 | 29.9% | 49.8 | 1.2 |
| Lower shell | B2003-2 | A302BM | B-4782-1 | 1.906E+19 | 1.136E+19 | 0.190 | 88 | 28.9% | 62.6 | 1.2 |
| Intermediate shell axial welds | 2-042 A/B/C | Linde 1092 | W5214 | 1.295E+19 | 7.72E+18 | 0.213 | 121 | 42.2% | 69.9 | 2.2 |
| Lower shell axial welds | 3-042 A/B | Linde 1092 | W5214 | 1.295E+19 | 7.72E+18 | 0.213 | 121 | 42.2% | 69.9 | 2.2 |
| Intermediate to lower shell circumferential weld | 9-042 | Linde 1092 | 34B009 | 1.906E+19 | 1.136E+19 | 0.192 | 82 | 34.2% | 53.9 | 1.2 |

## Table 4.2-2
## IP3 Charpy Upper-Shelf Energy Data for 48 Effective Full-Power Years (EFPY)

| Reactor Vessel Location (Beltline Identification) | Material Ident | Material Type | Heat # | Fluence Vessel Clad/BM 48 EFPY | Fluence 1/4T 48 EFPY | %Cu | Un-irradiated USE | %Drop in USE | 48 EFPY USE at 1/4T | RG 1.99 Position |
|---|---|---|---|---|---|---|---|---|---|---|
| Intermediate shell | B2802-1 | A302BM | B-5394-2 | 1.560E+19 | 9.298E+18 | 0.200 | 102 | 28.5% | 72.9 | 1.2 |
| Intermediate shell | B2802-2 | A302BM | A-0516-2 | 1.560E+19 | 9.298E+18 | 0.220 | 97 | 30.5% | 67.4 | 1.2 |
| Intermediate shell | B2802-3 | A302BM | B-5391-2 | 1.560E+19 | 9.298E+18 | 0.200 | 95 | 28.5% | 67.9 | 1.2 |
| Lower shell | B2803-1 | A302BM | A-0495-2 | 1.560E+19 | 9.298E+18 | 0.190 | 72 | 27.5% | 52.2 | 1.2 |
| Lower shell | B2803-2 | A302BM | C-1397-3 | 1.560E+19 | 9.298E+18 | 0.220 | 94 | 30.5% | 65.4 | 1.2 |
| Lower shell | B2803-3 | A302BM | A-0512-2 | 1.560E+19 | 9.298E+18 | 0.240 | 68 | 21.3% | 53.5 | 2.2 |
| Intermediate shell axial welds | 2-042 | Linde 1092 | 34B009 | 1.560E+19 | 9.298E+18 | 0.192 | 112 | 32.6% | 75.5 | 1.2 |
| Lower shell axial welds | 3-042 | Linde 1092 | 34B009 | 1.560E+19 | 9.298E+18 | 0.192 | 112 | 32.6% | 75.5 | 1.2 |
| Intermediate to lower shell circumferential weld | 9-042 | Linde 1092 | 13253 | 1.560E+19 | 9.298E+18 | 0.221 | 111 | 35.5% | 71.6 | 1.2 |

### 4.2.3 Pressure-Temperature Limits

Appendix G of 10 CFR 50 requires operation of the reactor pressure vessel within established pressure-temperature (P-T) limits. These limits are established by calculations that utilize the materials and fluence data obtained through the unit specific reactor surveillance capsule program. Normally, the pressure-temperature limits are calculated for several years into the future and remain valid for an established period of time.

Unit 2

Technical Specifications contain pressure/temperature limits valid through 25 EFPY including the effects of the stretch power uprate.

The P-T limit curves will continue to be updated, as required by Appendix G of 10 CFR Part 50 or as operational needs dictate. This updating will assure that the operational limits remain valid through the period of extended operation. Additional P-T limit analysis is not required at this time. Maintaining the P-T limit curves in accordance with Appendix G of 10 CFR 50 assures that the effects of aging on the intended function(s) will be adequately managed for the period of extended operation consistent with 10 CFR 54.21(c)(1)(iii).

Unit 3

Technical Specifications contain pressure/temperature limits valid through 34 EFPY including the effects of the stretch power uprate. At present, plate B2803-3 with an initial $RT_{NDT}$ of 74°F restricts operation (P-T) in the 150-250°F range. Resolution to the P-T operating window is a current operating term issue and will be resolved three years prior to reaching the $RT_{PTS}$ screening criterion per 10 CFR 50.61 requirements.

The P-T limit curves will continue to be updated, as required by Appendix G of 10 CFR Part 50 or as operational needs dictate. This updating will assure that the operational limits remain valid through the period of extended operation. Additional P-T limit analysis is not required at this time. Maintaining the P-T limit curves in accordance with Appendix G of 10 CFR 50 assures that the effects of aging on the intended function(s) will be adequately managed for the period of extended operation consistent with 10 CFR 54.21(c)(1)(iii).

### 4.2.4 Low Temperature Overpressure Protection (LTOP) PORV Setpoints

Each time the P-T limit curves are revised, LTOP must be re-evaluated to ensure its functional requirements can be met. Therefore, low temperature overpressure protection limits are considered part of the calculation of pressure/temperature curves. See Section 4.2.3.

### 4.2.5 Pressurized Thermal Shock

10 CFR 50.61(b)(1) provides rules for protection against pressurized thermal shock events for pressurized water reactors. Licensees are required to perform an assessment of the projected

values of the reference temperature for pressurized thermal shock ($RT_{PTS}$) whenever a significant change occurs in the parameters affecting $RT_{PTS}$, such as a change in the expiration date for the operation of the facility.

Section 10 CFR 50.61(b)(2) establishes screening criteria for $RT_{PTS}$ of 270° F for plates, forgings, and axial welds and 300° F for circumferential welds.

Regulatory Guide 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials" provides two methods for determining $RT_{PTS}$. Position 1 applies for material that does not have surveillance data available and Position 2 applies for material that does have surveillance data. Adjusted reference temperatures are calculated for both Positions 1 and 2 by following the guidance in Regulatory Guide 1.99, Sections 1.1 and 2.1, respectively, using copper and nickel content of beltline materials and end-of-life (EOL) best estimate fluence projections.

Unit 2

The projected 48 EFPY peak beltline fluence level at the clad/base metal interface of 1.906E+19 $n/cm^2$ was applied to all beltline materials, except axial welds where the expected peak fluence is 1.295E+19 $n/cm^2$. The resulting projected 48 EFPY $RT_{PTS}$ are shown in Table 4.2-3. All projected $RT_{PTS}$ values are within the established screening criteria at 48 EFPY. Values of $RT_{NDT}$ for the IP2 beltline materials at ¼ T and ¾ T are summarized in Table 4.2-5.

The TLAA for RTPTS is projected through the period of extended operation in accordance with 10CFR54.21(c)(1)(ii).

Unit 3

The projected 48 EFPY peak beltline fluence level at the clad/base metal interface of 1.560E+19 $n/cm^2$ was applied to all beltline materials. The resulting projected 48 EFPY $RT_{PTS}$ are shown in Table 4.2-4. All projected $RT_{PTS}$ values are within the established screening criteria for 48 EFPY with the exception of plate B2803-3, which exceeds the screening criterion by 9.9 F. Values of $RT_{NDT}$ for the IP3 beltline materials at ¼ T and ¾ T are summarized in Table 4.2-6.

As required by 10 CFR 50.61(b)(4), a plant-specific safety analysis for plate B2803-3 will be submitted to the NRC three years prior to reaching the $RT_{PTS}$ screening criterion. Alternatively, IP3 may choose to implement the revised PTS (10 CFR 50.61) rule if approved, which would permit use of Regulatory Guide 1.99, Revision 3. Application of Regulatory Guide 1.99, Revision 3 to plate B2803-3 is expected to result in an acceptable through-wall crack frequency at 48 EFPY.

Therefore, the $RT_{PTS}$ TLAA will be adequately managed for the period of extended operation in accordance with 10CFR54.21(c)(1)(iii).

## Table 4.2-3
## IP2 Pressurized Thermal Shock Data for 48 Effective Full-Power Years (EFPY)

| Reactor Vessel Location (Beltline Identification) | Material Ident | Material Type | Heat Number | %Cu | %Ni | Fluence Vessel Clad/BM ($10^{19}$ n/cm$^2$) | Fluence Factor | Chemistry Factor WCAP-15629 Rev. 1 | Un-irradiated $RT_{NDT}$ (°F) | $\Delta RT_{NDT}$ (°F) | Margin (°F) | 48 EFPY $RT_{PTS}$ (°F) | Method RG 1.99 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Intermediate shell | B2002-1 | A302BM | B-4688-2 | 0.190 | 0.650 | 1.906 | 1.176 | 114.0 | 34.0 | 134.1 | 17.0 | 185.1 | 2.1 |
| Intermediate shell | B2002-2 | A302BM | B-4701-2 | 0.170 | 0.460 | 1.906 | 1.176 | 118.2 | 21.0 | 139.1 | 34.0 | 194.1 | 2.1 |
| Intermediate shell | B2002-3 | A302BM | B-4922-1 | 0.250 | 0.600 | 1.906 | 1.176 | 181.9 | 21.0 | 214.0 | 17.0 | 252.0 | 2.1 |
| Lower shell | B2003-1 | A302BM | B-4791-1 | 0.200 | 0.660 | 1.906 | 1.176 | 152.00 | 20.0 | 178.8 | 34.0 | 232.8 | 1.1 |
| Lower shell | B2003-2 | A302BM | B-4782-1 | 0.190 | 0.480 | 1.906 | 1.176 | 128.80 | -20.0 | 151.5 | 34.0 | 165.5 | 1.1 |
| Intermediate shell axial welds | 2-042 A/B/C | Linde 1092 | W5214 | 0.213 | 1.007 | 1.295 | 1.072 | 254.7 | -56 | 273.0 | 44.0 | 261.0 | 2.1 |
| Lower shell axial welds | 3-042 A/B | Linde 1092 | W5214 | 0.213 | 1.007 | 1.295 | 1.072 | 254.7 | -56 | 273.0 | 44.0 | 261.0 | 2.1 |
| Intermediate to lower shell circumferential weld | 9-042 | Linde 1092 | 34B009 | 0.192 | 1.007 | 1.906 | 1.176 | 220.9 | -56 | 259.9 | 65.5 | 269.4 | 1.1 |

## Table 4.2-4
## IP3 Pressurized Thermal Shock Data for 48 Effective Full-Power Years (EFPY)

| **Reactor Vessel Location (Beltline Identification)** | **Material Ident** | **Material Type** | **Heat Number** | **%Cu** | **%Ni** | **Fluence Vessel Clad/BM ($10^{19}$ n/cm$^2$)** | **Fluence Factor** | **Chemistry Factor GL 92-01** | **Un-irradiated $RT_{NDT}$ (°F)** | **$\Delta RT_{NDT}$ (°F)** | **Margin (°F)** | **48 EFPY $RT_{PTS}$ (°F)** | **Method RG 1.99** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Intermediate shell | B2802-1 | A302BM | B-5394-2 | 0.200 | 0.500 | 1.560 | 1.123 | 137.0 | 5.0 | 153.8 | 34.0 | 192.8 | 1.1 |
| Intermediate shell | B2802-2 | A302BM | A-0516-2 | 0.220 | 0.530 | 1.560 | 1.123 | 151.6 | -4.0 | 170.2 | 34.0 | 200.2 | 1.1 |
| Intermediate shell | B2802-3 | A302BM | B-5391-2 | 0.200 | 0.490 | 1.560 | 1.123 | 135.8 | 17.0 | 152.5 | 34.0 | 203.5 | 1.1 |
| Lower shell | B2803-1 | A302BM | A-0495-2 | 0.190 | 0.470 | 1.560 | 1.123 | 127.7 | 49.0 | 143.4 | 34.0 | 226.4 | 1.1 |
| Lower shell | B2803-2 | A302BM | C-1397-3 | 0.220 | 0.520 | 1.560 | 1.123 | 150.2 | -5.0 | 168.7 | 34.0 | 197.7 | 1.1 |
| Lower shell | B2803-3 | A302BM | A-0512-2 | 0.240 | 0.520 | 1.560 | 1.123 | 168.2 | 74.0 | 188.9 | 17.0 | 279.9 | 2.1 |
| Intermediate shell axial welds | 2-042 | Linde 1092 | 34B009 | 0.192 | 1.007 | 1.560 | 1.123 | 221.3 | -56 | 248.5 | 65.5 | 258.0 | 1.1 |
| Lower shell axial welds | 3-042 | Linde 1092 | 34B009 | 0.192 | 1.007 | 1.560 | 1.123 | 221.3 | -56 | 248.5 | 65.5 | 258.0 | 1.1 |
| Intermediate to lower shell circumferential weld | 9-042 | Linde 1092 | 13253 | 0.221 | 0.732 | 1.560 | 1.123 | 189.1 | -54 | 212.3 | 56.0 | 214.3 | 1.1 |

## Table 4.2-5
## IP2 Adjusted Reference Temperature at 48 Effective Full-Power Years (EFPY)

| Reactor Vessel Location (Beltline Identification) | Material Ident | Heat Number | Chemistry Factor WCAP-15629 Rev. 1 | Un-irradiated $RT_{NDT}$ (° F) | 1/4 T Neutron Fluence ($10^{19}$ n/cm$^2$) | 1/4 T Fluence Factor | 1/4 T $\Delta RT_{NDT}$ (°F) | 3/4 T Neutron Fluence ($10^{19}$ n/cm$^2$) | 3/4 T Fluence Factor | 3/4 T $\Delta RT_{NDT}$ (°F) | 48 EFPY 1/4 T $RT_{NDT}$ (°F) | 48 EFPY 3/4 T $RT_{NDT}$ (°F) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Intermediate shell | B2002-1 | B-4688-2 | 114.0 | 34.0 | 1.136 | 1.036 | 118.1 | 0.404 | 0.748 | 85.3 | 169.1 | 136.3 |
| Intermediate shell | B2002-2 | B-4701-2 | 118.2 | 21.0 | 1.136 | 1.036 | 122.4 | 0.404 | 0.748 | 88.5 | 177.4 | 143.5 |
| Intermediate shell | B2002-3 | B-4922-1 | 181.9 | 21.0 | 1.136 | 1.036 | 188.4 | 0.404 | 0.748 | 136.1 | 226.4 | 174.1 |
| Lower shell | B2003-1 | B-4791-1 | 152.00 | 20.0 | 1.136 | 1.036 | 157.4 | 0.404 | 0.748 | 113.8 | 211.4 | 167.8 |
| Lower shell | B2003-2 | B-4782-1 | 128.80 | -20.0 | 1.136 | 1.036 | 133.4 | 0.404 | 0.748 | 96.4 | 147.4 | 110.4 |
| Intermediate shell axial welds | 2-042 A/B/C | W5214 | 254.7 | -56 | 0.772 | 0.927 | 236.2 | 0.274 | 0.647 | 164.9 | 224.2 | 152.9 |
| Lower shell axial welds | 3-042 A/B | W5214 | 254.7 | -56 | 0.772 | 0.927 | 236.2 | 0.274 | 0.647 | 164.9 | 224.2 | 152.9 |
| Intermediate to lower shell circumferential weld | 9-042 | 34B009 | 220.9 | -56 | 1.136 | 1.036 | 228.8 | 0.404 | 0.748 | 165.3 | 238.3 | 174.8 |

## Table 4.2-6
## IP3 Adjusted Reference Temperature at 48 Effective Full-Power Years (EFPY)

| Reactor Vessel Location (Beltline Identification) | Material Ident | Heat Number | Chemistry Factor RVID2 | Un-irradiated $RT_{NDT}$ (° F) | 1/4 T Neutron Fluence ($10^{19}$ n/cm$^2$) | 1/4 T Fluence Factor | 1/4 T $\Delta RT_{NDT}$ (° F) | 3/4 T Neutron Fluence ($10^{19}$ n/cm$^2$) | 3/4 T Fluence Factor | 3/4 T $\Delta RT_{NDT}$ (° F) | 48 EFPY 1/4 T $RT_{NDT}$ (° F) | 48 EFPY 3/4 T $RT_{NDT}$ (° F) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Intermediate shell | B2802-1 | B-5394-2 | 137.0 | 5.0 | 0.930 | 0.980 | 134.2 | 0.330 | 0.695 | 95.2 | 173.2 | 134.2 |
| Intermediate shell | B2802-2 | A-0516-2 | 151.6 | -4.0 | 0.930 | 0.980 | 148.5 | 0.330 | 0.695 | 105.4 | 178.5 | 135.4 |
| Intermediate shell | B2802-3 | B-5391-2 | 135.8 | 17.0 | 0.930 | 0.980 | 133.0 | 0.330 | 0.695 | 94.4 | 184.0 | 145.4 |
| Lower shell | B2803-1 | A-0495-2 | 127.7 | 49.0 | 0.930 | 0.980 | 125.1 | 0.330 | 0.695 | 88.8 | 208.1 | 171.8 |
| Lower shell | B2803-2 | C-1397-3 | 150.2 | -5.0 | 0.930 | 0.980 | 147.1 | 0.330 | 0.695 | 104.4 | 176.1 | 133.4 |
| Lower shell | B2803-3 | A-0512-2 | 168.2 | 74.0 | 0.930 | 0.980 | 164.8 | 0.330 | 0.695 | 116.9 | 255.8 | 207.9 |
| Intermediate shell axial welds | 2-042 | 34B009 | 221.3 | -56 | 0.930 | 0.980 | 216.7 | 0.330 | 0.695 | 153.8 | 226.2 | 163.3 |
| Lower shell axial welds | 3-042 | 34B009 | 221.3 | -56 | 0.930 | 0.980 | 216.7 | 0.330 | 0.695 | 153.8 | 226.2 | 163.3 |
| Intermediate to lower shell circumferential weld | 9-042 | 13253 | 189.1 | -54 | 0.930 | 0.980 | 185.2 | 0.330 | 0.695 | 131.4 | 187.2 | 133.4 |

### 4.2.6 References

4.2-1 Improved Technical Specifications, Appendix A to Facility Operating License No. DPR-64 (Indian Point 3), Amendment 231.

4.2-2 NL-04-069, Letter from F. Dacimo to NRC, Proposed Changes to Technical Specifications: Stretch Power Uprate (4.85%) and Adoption of TSTF-339, June 3, 2004.

4.2-3 NL-05-020, Letter from F. Dacimo to NRC, Reply to RAI Regarding Indian Point 3 License Amendment Requests for Stretch Power Uprate, February 11, 2005.

4.2-4 NL-02-006, Letter from F. Dacimo to NRC, Response to Request for Additional Information Indian Point 2 License Amendment Request for Reactor Coolant System Heatup and Cooldown Limitation Curves (TAC No.: MB2419), January 11, 2002.

4.2-5 US NRC, Reactor Vessel Integrity Database (RVID), Version 2.0.1, July 2000.

## 4.3 METAL FATIGUE

Fatigue analyses are potential TLAA for Class 1 and selected non-Class 1 mechanical components. Fatigue is an age-related degradation mechanism caused by cyclic stressing of a component by either mechanical or thermal stresses. Fatigue analyses are TLAA if they meet all six elements of the definition in 10 CFR 54.3(a). If the analyses are based on a number of cycles estimated for the current license term, they may be considered to meet criteria 54.3(a)(3) of being based on the current operating term. Evaluation of the TLAA, per 10 CFR 54.21 (c)(1), determines whether:

(i) The analyses remain valid for the period of extended operation,

(ii) The analyses have been projected to the end of the period of extend operation, or

(iii) The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

The aging management reviews conducted as part of the integrated plant assessment (IPA) (summarized in Section 3) identified all components that are susceptible to fatigue damage. If a component has a fatigue TLAA that remains valid (10 CFR 54.21 (c)(1)(i)) or is projected to cover the period of extended operation (10 CFR 54.21 (c)(1)(ii)), then cracking due to fatigue is not an aging effect requiring management for that component. If the TLAA does not remain valid for the period of extended operation, then cracking due to fatigue is an aging effect requiring management for the analyzed component. Cracking due to fatigue can be managed by a variety of plant programs in accordance with 10 CFR 54.21(c)(1)(iii).

Fracture mechanics analyses of flaws discovered during in-service inspection may be TLAA for those analyses based on time-limited assumptions defined by the current operating term. When a flaw is detected during in-service inspections, either the flaw must be repaired or the component that contains the flaw can be evaluated for continued service in accordance with ASME Section XI. These evaluations may show that the component is acceptable to the end of the license term based on projected in-service flaw growth. Flaw growth is typically predicted based on the design thermal and mechanical loading cycles.

### 4.3.1 Class 1 Fatigue

Components designed in accordance with ASME Section III have fatigue analyses. Current design basis fatigue evaluations calculate cumulative usage factors (CUFs) for components or sub-components based on design transient cycles. The design transients are listed in Table 4.3-1 for IP2 and Table 4.3-2 for IP3. The resulting CUFs are listed in their respective subcomponent section, starting with the reactor vessel in Section 4.3.1.1.

The current design basis fatigue evaluations do not consider the effects of reactor water environment on fatigue life. This is consistent with SECY-95-245, in which the NRC indicated that no immediate staff or licensee action is necessary to deal with the environmentally assisted fatigue issue prior to the period of extended operation for license renewal.

The numbers of cycles accrued to date have been projected to determine the numbers of cycles expected at the end of 60 years of operation. Tables 4.3-1 and 4.3-2 also show the projected values for the period of extended operation. With the limited exceptions discussed below, the projected numbers of cycles for 60 years of operation do not exceed the analyzed numbers of cycles.

The Fatigue Monitoring Program tracks and evaluates the design transients and requires corrective actions if the numbers of analyzed transients are approached. The Fatigue Monitoring Program ensures that the numbers of transient cycles experienced by the plant remain within the analyzed numbers of cycles, and hence the component CUFs remain below the values calculated in the design basis fatigue evaluations. Further details on the Fatigue Monitoring Program are provided in Appendix B.

Unit 2

The cycle counts are divided into normal conditions, test conditions, abnormal (upset) conditions, pressurizer spray actuations, and other events. A rate per day was calculated for each event and that rate was multiplied by the days remaining to the end of the period of extended operation to project the cycles. The rates for most transients were based on the cycles accrued to date and the time from initial operation.

Some transients, such as reactor trips, were projected based on more recent operating history, 1999 to 2005. This is because plant operating practices have changed and some of the transients occur more or less often now than they did early in plant life. There were substantially more reactor trips in the early years of operation at IPEC, and the rate of reactor trips experienced in the last six years is more representative of the rate of trips expected through the remainder of plant life.

The 60-year projections for IP2 show the following.

> The only normal condition projecting above the analyzed number of cycles is steady state fluctuations. The projection is $1.5 \times 10^6$ while the analyzed number is $1 \times 10^6$. However, the value shown in Table 4.3-1 is not based on actual cycles. The value shown in Table 4.3-1 for cycles as of 10/31/1999 is a calculated value based on the assumption that the transients occur at a constant rate that results in a number of transients over 40 years of operation equal to the analyzed number of transients. Hence the projection to 60 years based on this calculated value is 1.5 times the analyzed number of transients. In accordance with the Fatigue Monitoring Program, prior to the period of extended operation, corrective actions will be taken to confirm that monitoring is not required or to establish appropriate monitoring.

> Feedwater cycling, a replacement steam generator design transient limited to 18,300 cycles, does not appear on Table 4.3-1. The value of 18,300 is the projected value for 40 years of steam generator operation. Since the IP2 replacement steam generators will not be in service for 40 years at the end of the period of extended operation, feedwater cycling is not expected to exceed the analyzed number of cycles.
>
> The only abnormal condition projected to exceed its monitored limit is loss of power. Refer to the Fatigue Monitoring Program, Section B.1.12, for enhancements related to "loss of power" cycling.
>
> Several of the "Other Events" will exceed their analyzed numbers prior to the end of the period of extended operation. These transients apply to the charging system piping, which is evaluated as described in Section 4.3.3.

As indicated above, for certain events that affect fatigue usage, linear projections of the actual data to the end of the period of extended operation will exceed the analyzed number of design basis transients. However, because of the conservative nature of the CUF estimates, implicit margin exists. For those locations where additional fatigue analysis is required to take advantage of the implicit margin, actions will be taken in accordance with the Fatigue Monitoring Program prior to exceeding the analyzed numbers of transients.

IP2 will continue to monitor analyzed cycles under the Fatigue Monitoring Program. Enhancements to the Fatigue Monitoring Program discussed in Appendix B will address the 60-year projections discussed above.

Unit 3

Transients associated with the reactor vessel, safety injection actuations, and residual heat removal cycles are tracked. A rate per day was calculated for each transient and that rate was multiplied by the days remaining to 60 years to project the number of future cycles. The rates were based on the cycles accrued to date and the time from initial operation.

The numbers of plant heatups and cooldowns were taken from the IP3 Shutdown History and Shutdown Summary which contains the shutdown count through 1995. The rate from 1973 to 1995 was used to project shutdowns and startups, and this should be a conservative projection as improved operations have resulted in less frequent shutdowns/startups in recent years.

The 60-year projections for IP3 show that no transient will exceed the number of analyzed cycles prior to the end of the period of extended operation.

The Fatigue Monitoring Program will assure that the analyzed numbers of transients are not exceeded during the period of extended operation. Enhancements to the Fatigue Monitoring Program discussed in Appendix B will add additional transients to the Unit 3 list of transients monitored, similar to the Unit 2 list.

## Table 4.3-1
## IP2 Analyzed and Projected Number of Thermal Cycles

| Transient Condition | Analyzed Numbers of Cycles | Cycles as of 5/24/2005 | 60-year Projection 9/28/2033[1] |
|---|---|---|---|
| *Normal Conditions* | | | |
| Plant heatup at 100°F per hr | 200 | 103 | 196 |
| Plant cooldown at 100°F per hr | 200 | 103 | 196 |
| Refueling | 80 | 16 | 31 |
| Plant loading at 5 percent of full power per min | 14,500 | 1,500 | 2,844 |
| Plant unloading at 5 percent of full power per min | 14,500 | 1,092 | 2,071 |
| Step load increase of 10 percent of full power (but not to exceed full power) | 2,000 | 44 | 84 |
| Step load decrease of 10 percent of full power | 2,000 | 315 | 598 |
| Step load decrease of 50 percent of full power | 150 | 36 | 69 |
| Boron concentration equalization | 36,600 | 3,004 | 5,695 |
| Feedwater cycling | 2,000 | 416 | 789 |
| Loop out of service | 80 | 4 | 8 |
| Reactor coolant pump start/stop | 10,000 | 2018 | 3,826 |
| Steady state fluctuations | 1,000,000 | 781,209 | 1,480,919 |
| RCS depressurization from 2250 psig to 2000 psig | 50 | 2 | 4 |
| *Test Conditions* | | | |
| Turbine roll test | 20 | 1 | 2 |
| Hydrostatic test at 3110 psig | 1 | 1 | 1[2] |
| Hydrostatic test at 2485 psig, 400°F | 50 | 43 | 43[2] |
| Primary to secondary hydrotest, 1356 psi | 5 | 1 | 2 |

## Table 4.3-1
## IP2 Analyzed and Projected Number of Thermal Cycles (Continued)

| Transient Condition | | Analyzed Numbers of Cycles | Cycles as of 5/24/2005 | 60-year Projection 9/28/2033[1] |
|---|---|---|---|---|
| Secondary Hydro | SG-21 | 10 | 1 | 2 |
| | SG-22 | 10 | 1 | 2 |
| | SG-23 | 10 | 1 | 2 |
| | SG-24 | 10 | 1 | 2 |
| Secondary Pressure Test | SG-21 | 120 | 1 | 2 |
| (Primary at 0 psig, | SG-22 | 120 | 1 | 2 |
| Secondary at 1085 psig) | SG-23 | 120 | 1 | 2 |
| | SG-24 | 120 | 1 | 2 |
| *Abnormal Conditions* | | | | |
| Reactor trip | | 400 | 239 | 292[3] |
| - No excessive cooldown | | 230 | 88 | 124 |
| - Excessive cooldown | | 160 | 148 | 159 |
| - Excessive cooldown with safety injection | | 10 | 3 | 9 |
| Loss of load, without immediate turbine trip or reactor trip | | 80 | 31 | 59 |
| Loss of power | | 10 | 6 | 12 |
| Control rod drop (with reactor trip) | | 80 | 2 | 4 |
| Loss of secondary pressure | | 6 | 0 | 0 |
| Partial loss of flow, one pump only | | 80 | 13 | 25 |
| Excessive feedwater flow | | 30 | 0 | 0 |
| Inadvertent safety injection actuation | | 60 | 0 | 0 |
| Inadvertent startup of an RCP | | 10 | 0 | 0 |
| Inadvertent RCS depressurization | | 10 | 0 | 0 |
| Abnormal condition | | 270 | 44 | 84 |

## Table 4.3-1
## IP2 Analyzed and Projected Number of Thermal Cycles (Continued)

| Transient Condition | Analyzed Numbers of Cycles | Cycles as of 5/24/2005 | 60-year Projection 9/28/2033[1] |
|---|---|---|---|
| Turbine roll test | 20 | 1 | 2 |
| *Other Events* | | | |
| Pressurizer safety valve cycles | 40 | 0 | 0 |
| Power operated relief valve cycles | 100 | 4 | 8 |
| Charging and letdown flow shutoff and return to service | 171 | 129 | 267 |
| Letdown flow shutoff with prompt return to service | 507 | 348 | 583 |
| Letdown flow shutoff with delayed return to service | 3 | 2 | 2 |
| Charging flow shutoff with prompt return to service | 101 | 60 | 60 |
| Charging flow shutoff with delayed return to service | 0 | 0 | 0 |
| Charging flow step decrease and return to normal | 4118 | 2467 | 2543 |
| Charging flow step increase and return to normal | 4116 | 2466 | 2542 |
| Letdown flow step decrease and return to normal | 1642 | 1028 | 1283 |
| Letdown flow step increase and return to normal | 8688 | 6927 | 15860 |

1. Projection is the number of cycles as of 5/24/2005 plus the rate per day times the number of days from 5/24/2005 to the end of the period of extended operation.
2. Hydro tests are no longer required or performed. Therefore hydro tests are projected to remain at the current value for the remainder of plant life. Section 3.0 of WCAP-16169 states the vessel is currently analyzed for 200 hydrotests.
3. Total reactor trips were projected by summing the three sub-categories of trips below this entry, not by projecting the totals. This gives a conservative result due to the round up on each of the three parts.

## Table 4.3-2
## IP3 Analyzed and Projected Number of Thermal Cycles

| Transient Condition | | Analyzed Numbers of Cycles | Cycles as of 3/31/2006 | 60-year Projection[1] 12/12/2035 |
|---|---|---|---|---|
| 1 | Plant heatup at 100°F per hr | 200 | Note 2 | 120[2] |
| 2 | Plant cooldown at 100°F per hr | 200 | Note 2 | 120[2] |
| 3 | Plant loading at 5 percent of full power per minute | 14500 | 24 | 48 |
| 4 | Plant unloading at 5 percent of full power per minute | 14500 | 24 | 48 |
| 5 | Step load increase of 10 percent of full power (but not to exceed full power) | 2000 | 53 | 105 |
| 6 | Step load decrease of 10 percent of full power | 2000 | 53 | 105 |
| 7 | Step load decrease of 50 percent of full power | 200 | 26 | 52 |
| 8 | Reactor trip | 400 | 83 | 165 |
| 9 | Hydrostatic test at 3110 psig pressure | 5 | NA[3] | NA[3] |
| 10 | Hydrostatic test at 2485 psig pressure and 400°F temperature | 200 | NA[3] | NA[3] |
| 11 | Steady state fluctuations | Infinite | NA[4] | NA[4] |
| 12 | Loss of load, without immediate turbine trip or reactor trip | 80 | NA | 0 |
| 13 | Partial loss of flow, one pump only | 80 | 5 | 10 |
| 14 | Operating basis earthquake (OBE) | 5 | 0 | 0 |
| 15 | Design basis earthquake (DBE) | 1 | 0 | 0 |
| | SI actuations | 40 | 11 | 22 |
| | RHR cycles | 200 | 55 | 109 |

1. Cycle projection based on rate of occurrence of cycles between 1975 and 2006, unless otherwise indicated. Projection is the number of cycles as of 3/31/2006 plus the rate per day times the number of days from 3/31/2006 to the end of the period of extended operation, unless otherwise indicated.
2. Cycle projection based on rate of occurrence of cycles between 1975 and 1995. Projection is the number of cycles as of 12/31/1995 plus the rate per day times the number of days from 12/31/1995 to the end of the period of extended operation.
3. Hydro tests are no longer required or performed. Current values are zero and projections are zero.
4. As an infinite number of steady state fluctuations are allowed, these fluctuations are not counted.

### 4.3.1.1 Reactor Vessel

The reactor pressure vessel (and appurtenances) fatigue analyses were performed in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, 1965 Edition, 1966 and 1967 addenda. (A complete listing of applicable codes is given in Tables 4.1-9 of the IP2 and IP3 UFSARs.) The existing fatigue analyses of the reactor vessel are considered TLAA because they are based on numbers of cycles expected in 40 years of operation. The CUFs for the reactor pressure vessel are given in Table 4.3-3 for IP2 and Table 4.3-4 for IP3.

Design cyclic loadings and thermal conditions for the reactor pressure vessel were originally defined in the design specifications and analyzed in the original vessel stress reports. These analyses have been occasionally revised, most recently for the extended power uprate. These latest analyses are reflected in the current UFSAR tables. As described in Section 4.3.1, the projected numbers of transient cycles used for reactor vessel fatigue analyses remain within analyzed values. Consequently, the TLAA (reactor vessel fatigue analyses) based on those transients will remain valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i) for both IP2 and IP3.

## Table 4.3-3
## Current Cumulative Usage Factors for the IP2 Reactor Vessel

| Location | UFSAR Table 4.3-2 |
|---|---|
| Control rod housing | 0.01 |
| Head flange | 0.0107 |
| Vessel flange | 0.0229 |
| Closure studs | 0.944[1] |
| Primary nozzles - inlet | 0.050 |
| Primary nozzles – outlet | 0.281 |
| Core support pad (lateral) | 0.904 |
| Bottom head to shell | 0.004 |
| Bottom instrument penetrations | 0.201 |
| Nozzle belt to shell | 0.0029 |
| Head (CRDM) adapter plugs | 0.0036 |

1. The CUF of the reactor vessel studs was revised based on the optimization of the stud tensioning procedures and a UFSAR change is in process to reflect this revision. These CUFs were determined from the previous CUFs based on the change in peak stresses seen during the revised tensioning procedure; hence, these CUFs are also based on the design number of cycles.

## Table 4.3-4
## Current Cumulative Usage Factors for the IP3 Reactor Vessel

| Location | UFSAR Table 4.3-2 |
|---|---|
| Control rod housing | 0.124 |
| Head flange | 0.024 |
| Vessel flange | 0.023 |
| Closure studs | 0.944[1] |
| Primary nozzles - inlet | 0.049 |
| Primary nozzles – outlet | 0.259 |
| Core support pad (lateral) | 0.052 |
| Bottom head to shell | 0.02 |
| Bottom instrument penetrations | 0.206 |
| Nozzle belt to shell | 0.002 |
| Head (CRDM) adapter plugs | 0.0036 |

1. The CUF of the reactor vessel studs was revised based on the optimization of the stud tensioning procedures and a UFSAR change is in process to reflect this revision. These CUFs were determined from the previous CUFs based on the change in peak stresses seen during the revised tensioning procedure; hence, these CUFs are also based on the design number of cycles.

### 4.3.1.2 Reactor Vessel Internals

The IPEC reactor vessel internals were designed to meet the intent of Subsection NG of the ASME Boiler and Pressure Vessel Code, Section III. A plant-specific stress report on the reactor internals was not required. The structural integrity of the reactor internals design has been ensured by analyses performed on both generic and plant-specific bases. These analyses were used as the basis for evaluating critical reactor internal components with CUFs provided in Tables 4.3-5 and 4.3-6.

**Table 4.3-5**
**CUFs for the IP2 Reactor Vessel Internals**

| Location | CUF |
|---|---|
| Upper support plate assembly | 0.173 |
| Upper support plate flange | 0.065 |
| Upper core plate | 0.026 |
| Mid core barrel | 0.0197 |
| Upper core barrel | 0.0193 |
| Core barrel nozzle | 0.389 |
| Core barrel flange | 0.0193 |
| Lower radial key plate | 0.001 |
| Lower radial key 45° plane | 0.144 |
| Lower core plate | 0.420 |
| Lower core support plate | 0.521 |
| Lower support columns | 0.245 |

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**Table 4.3-6**
**CUFs for the IP3 Reactor Vessel Internals**

| Location | CUF |
|---|---|
| Upper support plate assembly | 0.81 |
| Upper core plate | 0.062 |
| Core barrel to LSP junction | 0.51 |
| Thermal shield | 0.348 |
| Lower core plate | 0.237 |
| Instrumentation columns | 0.22 |
| Lower support columns | 0.49 |

These CUFs are TLAA as they are based on numbers of cycles that were expected during 40 years of operation. Although not required by Code, these analyses were used to justify these components for service. The CUFs were based on the same transients as the reactor vessel, and those transients will not be exceeded in 60 years, therefore these TLAA remain valid for the period of extended operation per 10 CFR 54.21(c)(1)(i).

### 4.3.1.3 Pressurizer

In the original stress report the pressurizer shells were not analyzed for fatigue usage factors as they met the requirements of the ASME code, Section N-415.1, "Vessels Not Requiring Analysis for Cyclic Operation." The stress report contains a bounding analysis for the 1800 cubic foot pressurizer. This analysis bounds both IP2 and IP3 as well as other Westinghouse pressurizer designs. The design transients used in evaluating Sections N-415.1(a) through (f) of ASME Section III are given in the stress report. Each of eleven transients identified in the stress report was analyzed for a number of occurrences at or above the IPEC analyzed numbers given in Table 4.3-1 and Table 4.3-2.

Section 4.3.1 projected the numbers of cycles of the all transients used in the pressurizer fatigue determination, except steady state oscillations, would remain below the numbers analyzed by the stress report through the period of extended operation. The stress report analyzed the 106 steady state oscillations only for condition N-415.1(b), where these oscillations were determined to be "Not Significant." The projection of steady state oscillations therefore does not affect the results of the stress report evaluation of N-415.1.

Therefore the number of significant cycles will remain below that analyzed by the stress report. Thus the TLAA for determining that detailed fatigue analyses are not required remains valid for the period of extended operation in accordance with 10CFR54.21(c)(1)(i).

The original stress report did analyze the surge nozzle and spray nozzle.

The IPEC pressurizers were evaluated for the stretch power uprates and cumulative usage factors were updated. Usage factors are given in Tables 4.3-7 and 4.3-8.

**Table 4.3-7**
**Cumulative Usage Factors for the IP2 Pressurizer**

| Location | CUF |
|---|---|
| Safety and relief nozzle | 0.2047 |
| Spray nozzle | 0.996 |
| Upper shell | 0.4161 |
| Surge nozzle | 0.264 |

**Table 4.3-8**
**Cumulative Usage Factors for the IP3 Pressurizer**

| Location | CUF |
|---|---|
| Safety and relief nozzle | 0.1981 |
| Spray nozzle | 0.974 |
| Upper shell | 0.4161 |
| Surge nozzle | 0.9612 |

None of the design transients used in the analysis of the pressurizer will be exceeded as discussed in Section 4.3.1. The pressurizer fatigue analyses will thus remain valid for the period of extended operation in accordance with 10CFR54.21(c)(1)(i).

### Insurge/Outsurge Transients

The impact of pressurizer insurge/outsurge transients was not considered in original design basis calculations for the pressurizer. The IP2 CUF of record for the pressurizer surge nozzle remains the original design stress report number of 0.264. IP3 re-evaluated the CUF of the pressurizer surge line nozzle considering insurge/outsurge during the 200 design heatups and cooldowns. The revised CUF for IP3 is 0.9612. The CUFs are reflected in Tables 4.3-7 and 4.3-8. As the cycles on which these analyses are based will not be exceeded through the period of extended operation, these TLAA remain valid through the period of extended operation per 10CFR54.21(c)(1)(i). Nonetheless, as the surge nozzles require environmental fatigue considerations, they will be reanalyzed for license renewal as discussed in Section 4.3.3.

#### 4.3.1.4 Steam Generators

*Summary Description*

IP2 replaced steam generators during an outage completed in January 2001. IP3 replaced steam generators during an outage completed in June 1989. The IPEC replacement steam generators were analyzed for fatigue in their component stress reports. The replacement steam generators were re-evaluated with respect to fatigue for the power increase.

Cumulative usage factors for critical components, shown in Table 4.3-9 and 4.3-10, are from the power uprate analyses. Usage factors for additional, non-critical, components are available in the stress reports. The usage factor calculations are considered TLAA.

**Table 4.3-9**
**Cumulative Usage Factors for the IP2 Steam Generators**

| **Location** | **CUF** |
|---|---|
| *Primary Side* | |
| Divider plate | 0.683 |
| Tubesheet/shell junction | 0.451 |
| Tube/tubesheet weld | 0.809 |
| Tubes | 0.484 |
| *Secondary Side* | |
| Main feedwater nozzle | 0.898 |
| Secondary manway stud[1] | 0.438 |
| Steam nozzle | 0.212 |
| Steam nozzle support ring | 0.220 |
| Steam nozzle insert | 0.212 |

1. The IP2 replacement steam generators use studs and nuts. There are no longer any secondary manway bolts in use at IPEC.

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**Table 4.3-10**
**Cumulative Usage Factors for the IP3 Steam Generators**

| Location | CUF |
|---|---|
| *Primary Side* | |
| Divider plate | 0.789 |
| Tubesheet/shell junction | 0.416 |
| Tube/tubesheet weld | 0.082 |
| Tubes | 0.161 |
| *Secondary Side* | |
| Main feedwater nozzle | 1.00 |
| Secondary manway stud[1] | 0.920 |
| Steam nozzle | 0.023 |
| Steam nozzle support ring | 0.894 |
| Steam nozzle insert | 0.208 |

1. The IP3 replacement steam generators use studs and nuts. There are no longer any secondary manway bolts in use at IPEC.

*Evaluation*

Section 4.3.1 projects that none of the design transients used for steam generator fatigue analysis will exceed their analyzed numbers during the period of extended operation. These usage factor calculations are based on the design transients discussed in Section 4.3.1 and will remain valid for the period of extended operation in accordance with 10CFR54.21(c)(1)(i).

### 4.3.1.5 Reactor Coolant Pump Fatigue Analysis

The reactor coolant pumps were evaluated with respect to fatigue for the stretch power uprate. Stresses in the reactor coolant pumps were reviewed and shown to remain within the ASME Code allowable stresses. These stress calculations have no time dependent assumptions and therefore are not TLAA.

Detailed fatigue analyses of RCP casings were not required because the conditions specified in the 1965 edition of the ASME code Sections N-415.1(a) through (f), “Vessels Not Requiring Analysis for Cyclic Operation,” were met. These fatigue waiver evaluations may be considered TLAA if they used the numbers of design cycles in the evaluation of items N-415.1(a) through (f). IPEC has chosen to conservatively call the evaluations TLAA. These determinations were based on the numbers of design cycles. The projections in Tables 4.3-1 and 4.3-2 show that the numbers of significant cycles in 60 years will remain below the numbers of cycles used in these determinations. Thus the TLAAs for determining that detailed fatigue analyses are not required remain valid for the period of extended operation in accordance with 10CFR54.21(c)(1)(i).

Unit 2

From stretch power uprate analyses, the CUF for the RCP main flange bolts is 0.44. As this CUF is based on the design transients, and the design transients will not be exceeded, the calculation of CUF for the main flange bolts remains valid for the period of extended operation in accordance with 10CFR54.21(1)(c)(i).

Unit 3

From stretch power uprate analyses, the CUF for the RCP main flange bolts is 0.32. As this CUF is based on the design transients, and the design transients will not be exceeded, the calculation of CUF for the main flange bolts remains valid for the period of extended operation in accordance with 10CFR54.21(1)(c)(i).

### 4.3.1.6 Control Rod Drive Mechanisms

The IPEC control rod drive mechanisms were originally analyzed for fatigue in the generic component stress report. The IPEC control rod drive mechanisms were evaluated with respect to fatigue for the power uprate and cumulative usage factors, provided in Tables 4.3-11 and 4.3-12, were updated. These usage factor calculations are considered TLAA as they are based on design transients intended to allow at least 40 years of operation.

**Table 4.3-11**
**Cumulative Usage Factors for the IP2 CRDMs**

| Location | CUF |
|---|---|
| Upper joint canopy | 0.858 |
| Upper joint weld canopy | 0.5045 |
| Upper joint threaded area | 0.36025 |
| Middle joint weld canopy | 0.5235 |
| Lower joint weld canopy | 0.02422 |

**Table 4.3-12**
**Cumulative Usage Factors for the IP3 CRDMs**

| Location | CUF |
|---|---|
| Upper joint canopy | 0.763 |
| Middle joint weld canopy | 0.425 |
| Lower joint weld canopy | 0.003 |
| Capped latch housing | 0.093 |

As discussed in Section 4.3.1, the numbers of analyzed design transients used in this fatigue analysis will not be exceeded in 60 years of operation and thus this TLAA will remain valid through the period of extended operation in accordance with 10CFR54.21(c)(1)(i).

### 4.3.1.7 Class-1 Heat Exchangers

The original manufacturing equipment specification for the regenerative letdown heat exchangers and the excess letdown heat exchangers says these heat exchangers are to be qualified for various transients. The E-spec suggests that the manufacturer should verify in writing that all conditions of Paragraph N-415.1 of Section III are satisfied for the transient conditions; otherwise, a fatigue analysis is required. The IPEC UFSARs say the regenerative letdown heat exchangers and the excess letdown heat exchangers are qualified to 2000 temperature cycles.

Westinghouse determined that the regenerative heat exchanger was the controlling heat exchanger with regards to fatigue, and therefore only that heat exchanger was analyzed. The associated report concludes that by 10/31/1999, Unit 2 had accumulated 466 of the analyzed 2000 cycles (23.3%) on the regenerative heat exchanger. Further, since the analyzed CUF was only 0.235, the CUF as of 10/31/1999 was equal to 0.235 x 23.3% = 0.05. For license renewal, the thermal cycles seen by the regenerative heat exchanger can be projected through the period of extended operation to show that only 1072 cycles (54%) are expected in 60 years, corresponding to a projected CUF of 0.235 x 54% = 0.13. The IP3 auxiliary heat exchangers have no plant-specific evaluation. However, the similarity in design and operation between the two units indicates the results would be similar. As the projected IP2 CUF is 0.13, it follows that the IP3 CUF would also be well below the limit of 1.0, such that a plant-specific analysis is not required. Thus the TLAA for the heat exchanger fatigue remains valid for the period of extended operation in accordance with 10CFR54.21(c)(1)(i).

IPEC design documents indicate that the auxiliary heat exchangers are not the limiting components in the CVCS system. The charging nozzles are more limiting. Therefore, monitoring of the charging nozzles will assure acceptability of the auxiliary heat exchangers.

Because the charging nozzle is one of the locations identified by NUREG-6260 as requiring environmental adjustments to the fatigue analysis, this nozzle will be evaluated with the other NUREG-6260 locations as discussed in Section 4.3.3.

#### 4.3.1.8 Class 1 Piping and Components

ANSI B31.1 Piping

The IPEC Class 1 boundary corresponds to all reactor coolant system (RCS) pressure boundary components within the ASME Section XI, IWB inspection boundary.

USAS B31.1 was used in the design of the primary coolant piping. A thermal expansion flexibility stress analysis was performed on the main primary coolant piping in accordance with the criteria set forth in USAS B31.1 to ensure that the stress range is within the prescribed limits. As per the requirements of USAS B31.1, no fatigue analysis is required and no fatigue analysis of the reactor coolant loop piping is performed. Rather stress range reduction factors are used to account for anticipated transients (normally, a stress range reduction factor of 1.0 is acceptable in the stress analyses for up to 7000 cycles).

IPEC evaluated the projected thermal cycles for 60 years of plant operation at IP2. For IP2 Class 1 piping, thermal cycling is limited to the transients identified in Table 4.3-1 and through the period of extended operation will remain well below the 7000 cycles allowed by B31.1 for a stress range reduction factor of 1.0.

IPEC evaluated the projected thermal cycles for 60 years of plant operation at IP3. For IP3 Class 1 piping, thermal cycling is limited to the transients identified in Table 4.3-2. Counting every expected transient, the total cycles in 60 years of operation is well below the 7000 cycles allowed by B31.1 for a stress range reduction factor of 1.0.

The results of this evaluation indicate that 7000 thermal cycles will not be exceeded for 60 years of operation. Therefore, the Class 1 pipe stress calculations are valid for the period of extended operation. Thus, the TLAA remains valid for the extended period of operation in accordance with 10 CFR 54.21(c)(1)(i).

Pressurizer Surge Line Piping

NRC Bulletin 88-11 addresses potential thermal stresses associated with thermal stratification experienced by the pressurizer surge line. Thermal stratification in the pressurizer surge line can cause unexpected piping movement and potential plastic deformation. The original design analyses for IP2 and IP3 did not consider thermal stratification of the surge line. Per NRC Bulletin 88-11, utilities were required to establish and implement a program to confirm pressurizer surge line integrity in view of the occurrence of thermal stratification as a result of the plant heatup/cooldown cycles. IPEC participated in a program to assess the impact of pressurizer insurge/outsurge transients on the structural integrity of the pressurizer. Operating procedures were modified to decrease the severity of transients resulting from pressurizer surges during heatup and cooldown. New pressurizer lower head transients were developed based on the modified operating procedures and usage factors of the limiting pressurizer items in the lower head were reevaluated and shown to be less than 1.0 for 40 years. These analyses were performed as a Westinghouse Owners Group task, supplemented by additional unit-specific inspections and activities. The NRC review of the Westinghouse Owners Group task concluded that plant-specific analyses would be required for 28 Westinghouse plants, including IP2 and IP3. Plant-specific analyses for IP2/IP3 were performed in 1991 and the NRC reviewed the analyses and concluded that IPEC had addressed the actions required by Bulletin 88-11. The maximum CUF for the IP2 and IP3 surge line piping occurred at the pipe side of the pressurizer nozzle safe end with a value of 0.60.

The site-specific evaluations of the pressurizer surge line are considered TLAA since the evaluations use time-limited assumptions such as thermal and pressure transients, and operating cycles. The dominant cycles in the surge line analysis are the 200 heatups and cooldowns, including the stratification and striping associated with those transients. As discussed in Section 4.3.1, the number of analyzed heatups/cooldowns, as well as the other design transients presented in Tables 4.3-1 and 4.3-2, will not be exceeded in 60 years of operation. Thus this TLAA remains valid through the end of the period of extended operation in accordance with 10CFR54.21(c)(1)(i).

Thermowells

Westinghouse identified cumulative usage factors for various thermowells associated with the IPEC pressurizers based on 200 heatups and cooldowns with a maximum CUF of 0.021. Since Table 4.3-1 and Table 4.3-2 project that 200 heatups and cooldowns will not be exceeded, this TLAA remains valid for the period of extended operation in accordance with 10CFR54.21(c)(1)(i).

Charging System Piping

*Unit 2*

The IP2 charging system piping fatigue analysis determined the limiting CUF for the charging nozzle as 0.99 for the numbers of analyzed transients shown in the last nine entries in Table 4.3-1. As shown in Table 4.3-1, three of these nine transients are expected to exceed their analyzed number by the end of 60 years of operation. Because the charging nozzle is one of the locations identified by NUREG-6260 as requiring environmental adjustments to the fatigue analysis, this nozzle will be evaluated with the other NUREG-6260 locations as discussed in Section 4.3.3.

*Unit 3*

No specific analysis of the IP3 charging system piping was identified. However, because the charging nozzle is one of the locations identified by NUREG-6260 as requiring environmental adjustments to the fatigue analysis, this nozzle will be evaluated with the other NUREG-6260 locations as discussed in Section 4.3.3 below.

IP2 Loop 3 Accumulator Nozzle

The IP2 loop 3 accumulator nozzle does not have a thermal sleeve. Although this piping was built to B31.1 and no fatigue analysis of the piping was originally performed, a fatigue analysis was performed to justify continued operation without the thermal sleeve. An analysis of the nozzle determined the CUF to be 0.95. This analysis was based on the same design cycles as the reactor vessel, and those analyzed numbers of cycles will not be exceeded for 60 years of operation. Therefore, this TLAA for the IP2 loop 3 accumulator nozzle remains valid for the period of extended operation per 10CFR54.21(c)(1)(i).

### 4.3.2 Non-Class 1 Fatigue

The design of ASME III Code Class 2 and 3 piping systems incorporates the Code stress reduction factor for determining acceptability of piping design with respect to thermal stresses. In general, 7000 thermal cycles are assumed, allowing a stress reduction factor of 1.0 in the stress analyses. IPEC evaluated the validity of this assumption for 60 years of plant operation. The results of this evaluation indicate that the 7000 thermal cycle assumption is valid and bounding for 60 years of operation. Therefore, the pipe stress calculations are valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

Review of potential TLAAs for IPEC non-Class 1 components identified a fatigue analysis only for the residual heat removal (RHR) heat exchanger.

Residual Heat Removal Heat Exchanger

The original manufacturing equipment specification states the RHR heat exchanger is to be qualified for 200 cycles that would occur during plant shutdowns. The IP2 UFSAR, Table 6.2-8 and the IP3 UFSAR, Table 6.2-6 state the RHR heat exchangers are qualified to 200 cycles from 85 °F to 350 °F.

No fatigue analyses for these heat exchangers have been identified. It is believed that the manufacturers showed the requirements of Paragraph N-415.1 of ASME Section III were met; but no written statement from the manufacturer has been found. Nonetheless, IPEC is conservatively considering that determination a TLAA. This TLAA is considered based on the specified 200 design cycles, corresponding to the 200 design heatups/cooldowns for the reactor coolant system. The system will not exceed 200 heatups and cooldowns in 60 years as projected in Tables 4.3-1 and 4.3-2. Thus this TLAA remains valid for the period of extended operation in accordance with 10CFR54.21(c)(1)(i).

### 4.3.3 Effects of Reactor Water Environment on Fatigue Life

Industry test data indicate that certain environmental effects (such as temperature, dissolved oxygen content, and strain rate) in the primary systems of light water reactors could result in greater susceptibility to fatigue than would be predicted by fatigue analyses based on the ASME Section III design fatigue curves. The ASME design fatigue curves were based on laboratory tests in air and at low temperatures. Although the failure curves derived from laboratory tests were adjusted to account for effects such as data scatter, size effect, and surface finish, these adjustments may not be sufficient to account for actual plant operating environments.

As reported in SECY-95-245, the NRC believes that no immediate staff or licensee action is necessary to deal with the environmentally assisted fatigue issue. In addition, the staff concluded that it could not justify requiring a back fit of the environmental fatigue data to operating plants. However, the NRC concluded that, because metal fatigue effects increase with service life, environmentally assisted fatigue should be evaluated for any proposed extended period of operation for license renewal.

NUREG/CR-6260 applied the fatigue design curves that incorporated environmental effects to several plants and identified locations of interest for consideration of environmental effects. Section 5.5 of NUREG/CR-6260 identified the following component locations to be most sensitive to environmental effects for IPEC vintage Westinghouse plants. These locations and the subsequent calculations are directly relevant to IPEC.

1. Reactor vessel shell and lower head
2. Reactor vessel inlet and outlet nozzles
3. Pressurizer surge line (including hot leg and pressurizer nozzles)
4. RCS piping charging system nozzle
5. RCS piping safety injection nozzle
6. RHR Class 1 piping

IPEC evaluated the limiting locations using the guidance provided in NUREG-1801, Volume 2, Section X.M1. NUREG-1801 calls for using the guidance (formulas) provided in NUREG/CR-5704 and NUREG/CR-6583 to calculate environmentally assisted fatigue correction factors ($F_{en}$).

The environmentally adjusted CUFs for IPEC are shown in Table 4.3-13 (Unit 2) and Table 4.3-14 (Unit 3). All locations within the reactor vessel, shell, heads and nozzles have environmentally adjusted CUFs less than 1.0. All surge line piping and IP2 charging system nozzle have environmentally adjusted CUFs greater than 1.0.

IPEC has no plant-specific CUFs for some of the piping locations identified in NUREG-6260. At IPEC these locations are designed to ASME piping code B31.1, and no specific fatigue analysis resulting in CUFs is required by the current licensing basis.

The IP2 pressurizer surge nozzle has an environmentally adjusted CUF less than 1.0, while the IP3 pressurizer surge nozzle has an environmentally adjusted CUF of greater than 1.0. This is because the IP3 surge nozzle calculation includes the effects of the insurges/outsurges seen by these nozzles, while the IP2 analysis does not include these effects. IPEC will re-analyze the pressurizer surge line nozzle for both units, including insurge/outsurge and environmental effects. The pressurizer surge line nozzle re-analysis will review other components in the lower portion of the pressurizer to assure that the limiting IPEC location has been analyzed.

For those locations with CUFs less than 1.0, the TLAA has been projected through the period of extended operation per 10CFR54.21(c)(1)(ii).

Due to the factor of safety included in the ASME code, a CUF of greater than 1.0 does not indicate that fatigue cracking is expected; rather, it indicates that there is a higher potential for fatigue cracking at locations having CUFs exceeding 1.0. Tables 4.3-13 and 4.3-14 do not indicate that 40 year CUFs will exceed 1.0 because the EAF adjustment is not applied during the initial 40 years of operation. However, some of the CUFs will exceed 1.0 at the beginning of the period of extended operation when the EAF adjustment is added to the CUF calculation.

At least 2 years prior to entering the period of extended operation, for the locations identified in NUREG/CR-6260 for Westinghouse PWRs of the IPEC vintage, IPEC will implement one or more of the following:

(1) Refine the fatigue analyses to determine valid CUFs less than 1 when accounting for the effects of reactor water environment. This includes applying the appropriate Fen factors to valid CUFs determined in accordance with one of the following.

For locations, including NUREG/CR-6260 locations, with existing fatigue analysis valid for the period of extended operation, use the existing CUF to determine the environmentally adjusted CUF.

More limiting IPEC-specific locations with a valid CUF may be added in addition to the NUREG/CR-6260 locations. In particular, the pressurizer lower shell will be reviewed to ensure the surge nozzle remains the limiting component.

Representative CUF values from other plants, adjusted to or enveloping the IPEC plant-specific external loads may be used if demonstrated applicable to IPEC.

An analysis using an NRC-approved version of the ASME code or NRC-approved alternative (e.g., NRC-approved code case) may be performed to determine a valid CUF.

(2) Manage the effects of aging due to fatigue at the affected locations by an inspection program that has been reviewed and approved by the NRC (e.g., periodic non-destructive examination of the affected locations at inspection intervals to be determined by a method acceptable to the NRC).

(3) Repair or replace the affected locations before exceeding a CUF of 1.0.

Should IPEC select the option to manage the aging effects due to environmental-assisted fatigue during the period of extended operation, details of the aging management program such as scope, qualification, method, and frequency will be submitted to the NRC at least 2 years prior to the period of extended operation.

Depending on the option chosen, which may vary by component, this TLAA will be projected through the period of extended operation per 10CFR54.21(c)(1)(ii) or the effects of environmentally assisted fatigue will be managed per 10CFR54.21(c)(1)(iii).

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## Table 4.3-13
## IP2 Cumulative Usage Factors for NUREG/CR-6260 Limiting Locations

| NUREG-6260 Generic Location | | IP2 Plant-Specific Location | Material Type | CUF of Record | Per NUREG/CR-6583 or NUREG/CR-5704 | |
|---|---|---|---|---|---|---|
| | | | | | $F_{en}$ | Environmentally Adjusted CUF |
| 1 | Vessel shell and lower head | Bottom head to shell | LAS | 0.004 | 2.45 | 0.01 |
| 2 | Vessel inlet and outlet nozzles | Reactor vessel inlet nozzle | LAS | 0.05 | 2.45 | 0.12 |
| 2 | Vessel inlet and outlet nozzles | Reactor vessel outlet nozzle | LAS | 0.281 | 2.45 | 0.69 |
| 3 | Pressurizer surge line nozzles | Pressurizer surge nozzle[1] | LAS | 0.264 | 2.45 | 0.646 |
| 3 | Pressurizer surge line piping | Surge line piping to safe end weld | SS | 0.6 | 15.35 | 9.21 |
| 4 | RCS piping charging system nozzle | Charging system nozzle | SS | 0.99 | 15.35 | 15.20 |
| 5 | RCS piping safety injection nozzle | NA[2] | SS | NA[2] | 15.35 | NA[2] |
| 6 | RHR Class 1 piping | NA[2] | SS | NA[2] | 15.35 | NA[2] |

1. The surge line nozzle in the RCS piping is bounded by the surge line piping to safe end weld at the pressurizer nozzle.
2. The RCS piping at IP2 is designed to ANSI B31.1 and as such no fatigue analysis was performed and no CUFs were calculated.

## Table 4.3-14
## IP3 Cumulative Usage Factors for NUREG/CR-6260 Limiting Locations

| | NUREG-6260 Location | IP3 Plant-Specific Location | Material Type | CUF of Record | Per NUREG/CR-6583 or NUREG/CR-5704 | |
|---|---|---|---|---|---|---|
| | | | | | $F_{en}$ | Environmentally Adjusted CUF |
| 1 | Vessel shell and lower head | Bottom head to shell | LAS | 0.02 | 2.45 | 0.05 |
| 2 | Vessel inlet and outlet nozzles | Reactor vessel inlet nozzle | LAS | 0.049 | 2.45 | 0.12 |
| 2 | Vessel inlet and outlet nozzles | Reactor vessel outlet nozzle | LAS | 0.259 | 2.45 | 0.64 |
| 3 | Pressurizer surge line nozzles | Pressurizer surge line nozzle[1] | LAS | 0.9612 | 2.45 | 2.35 |
| 3 | Pressurizer surge line piping | Surge line piping to safe end weld | SS | 0.6 | 15.35 | 9.21 |
| 4 | RCS piping charging system nozzle | NA[2] | SS | NA[2] | 15.35 | NA[2] |
| 5 | RCS piping safety injection nozzle | NA[2] | SS | NA[2] | 15.35 | NA[2] |
| 6 | RHR Class 1 piping | NA[2] | SS | NA[2] | 15.35 | NA[2] |

1. The surge line nozzle in the RCS piping is bounded by the surge line piping to safe end weld at the pressurizer nozzle.
2. The RCS piping at IP3 is designed to ANSI B31.1 and as such no fatigue analysis was performed and no CUFs were calculated.

## 4.4 ENVIRONMENTAL QUALIFICATION (EQ) OF ELECTRIC EQUIPMENT

Summary Description

IPEC evaluates environmentally qualified (EQ) electrical components using 10 CFR 50.49(f) qualification methods. Equipment qualifications evaluations that specify a qualification duration of at least 40 years, but less than 60 years, are considered TLAA for license renewal.

Evaluation

These TLAA have not been projected for the period of extended operation; rather, the aging effects associated with these analyses are managed by the Environmental Qualification of Electric Components (EQ) Program in accordance with 10 CFR 54.21(c)(1)(iii).

The EQ Program is an existing program established to meet IPEC commitments for 10 CFR 50.49. It is consistent with NUREG-1801, Section X.E1, "Environmental Qualification (EQ) of Electric Components." Consistent with NRC guidance provided in RIS 2003-09, no additional information is required to address GSI 168, "EQ of Electrical Components."

## 4.5 CONCRETE CONTAINMENT TENDON PRESTRESS

This section is not applicable as IPEC does not have pre-stressed tendons in the containment structures.

## 4.6 CONTAINMENT LINER PLATE AND PENETRATION FATIGUE ANALYSES

### Unit 2

*Summary Description*

In 1973, a feedwater line cracked circumferentially resulting in damage to the liner plate causing containment liner plate buckling at the penetration for feedwater line #22. No repair was required for this buckling of the liner plate.

Studies were performed to evaluate the effects of fatigue on the deformed area of the liner due to predicted high strain-limited cycle loading during its projected forty-year life. The evaluation used an AEC-approved maximum strain and concluded that the strain load endurance limit of the material was 450 cycles at 7.7% strain. The evaluation estimated that the containment liner was likely to see 50 LOCAs (concurrent with earthquakes) at 1% strain, and 8 cycles from containment testing (1 pre-startup full pressure test at 6.5% strain and 7 cycles at 3.25% strain). This combines to 58 cycles at assorted strain (6.5% maximum strain). The evaluation conservatively projected a worst case of 60 cycles at 6.5% strain. As this projection was so far below the allowed 450 cycles at 7.7% strain, no further analysis was performed.

*Evaluation*

IP2 will not experience 50 LOCAs/earthquakes in 60 years of operation. Containment pressure testing is scheduled only once every 10 years. Therefore, the number of cycles experienced will continue to be less than the 60 cycles originally assumed and well below the 450 cycle limit in 60 years of operation. Therefore, the TLAA associated with the IP2 liner adjacent to the feedwater line #22 penetration remains valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

There are no other TLAA associated with IP2 containment liner plate or penetrations.

### Unit 3

There are no TLAA associated with the IP3 containment liner plate or penetrations

## 4.7 OTHER PLANT-SPECIFIC TLAA

### 4.7.1 Reactor Coolant Pump Flywheel Analysis

*Summary Description*

The reactor coolant pump motors are provided with flywheels to increase rotational inertia, thus prolonging pump coast-down and assuring a more gradual loss of primary coolant flow to the core in the event that pump power is lost. The aging effect of concern is fatigue crack initiation and growth in the flywheel bore keyway from stresses due to starting the motor. Regulatory Guide 1.14 recommends periodic volumetric inspection of flywheels.

IPEC inspects the RCP flywheels as required by Technical Specifications (IP2: Section 5.5.5, IP3: Section 5.5.6). These inspections are performed at least once every 20 years in accordance with the staff approved WCAP-15666-A. WCAP-15666-A is based on 6000 start/stop cycles of a reactor coolant pump, an order of magnitude beyond the number of cycles that are expected in 60 years.

As indicated in Tables 4.3-1 and 4.3-2, the allowable number of heatup and cooldown cycles for 60 years of operation is 200 for Units 2 and 3. The analyzed number of cycles is far greater than the expected number, even if multiple reactor coolant pump starts are assumed in each startup/ shutdown cycle. Because the 6000 cycles assumed in the analysis far exceeds the expected cycles in 60 years, and because the analysis is based on 60 years rather than 40 years, this analysis does not meet the 10CFR54(3)(a)(3) criteria for a TLAA. It does not involve time-limited assumptions defined by the current operating term or by an operating term less than the current operating term plus the period of extended operation requested in the license renewal application.

*Evaluation*

Evaluation is not applicable since the flywheel analysis is not a time-limited aging analysis as defined by 10 CFR 54.3. The analysis does not meet Part (3) of the definition in 10 CFR 54.3, Definitions.

### 4.7.2 Leak before Break

*Summary Description*

Leak before break (LBB) analyses evaluate postulated flaw growth in piping. These analyses consider the thermal aging of the CASS piping and fatigue transients that drive flaw growth over the operating life of the plant. Because these two analysis considerations could be influenced by time, LBB analyses are identified as potential TLAA.

Unit 2

The structural design of IP2 considered and protected against the effect of postulated reactor coolant loop pipe ruptures. LBB analyses have been documented in WCAP-10977, WCAP-10977 Supplement 1, and WCAP-10931. The time-related assumptions in the analyses include the thermal aging of cast austenitic stainless steel and the fatigue crack growth analysis. These two assumptions are addressed below.

Unit 3

The structural design of IP3 considered and protected against the effect of postulated reactor coolant loop pipe ruptures. LBB analyses have been documented in Appendix A of WCAP-8228. The time-related assumptions in the analyses include the thermal aging of cast austenitic stainless steel and the fatigue crack growth analysis. These two assumptions are addressed below.

Thermal Aging of CASS

The first analysis consideration that could be influenced by time is the material properties of cast austenitic stainless steel (CASS) used in the pipe fittings. Thermal aging causes an elevation in the yield strength of CASS and a decrease in fracture toughness, the decrease being proportional to the level of ferrite in the material. Thermal aging in these stainless steels will continue until a saturation, or fully aged, point is reached. The analyses used fully aged toughness values. As the LBB evaluations for both units use saturated (fully aged) fracture toughness properties, these analyses do not have a material property time-dependency and are not considered TLAA.

Fatigue Crack Growth

The second analysis consideration that could be influenced by time is the accumulation of actual fatigue transient cycles. A fatigue crack growth analysis of the reactor vessel inlet nozzle to safe-end region was performed to determine its sensitivity to the presence of small cracks. The nozzle to safe-end connection was selected because crack growth calculated at this location is representative of the entire primary loop. The nozzle to safe-end connection configuration includes an SA-508 Class 2 or Class 3 stainless steel clad nozzle connected to a stainless steel safe end by a nickel-based alloy weld. The crack growth due to fatigue was evaluated assuming the reactor vessel experienced the total allowable numbers of normal, upset, and test transients.

*Evaluation*

The calculated fatigue crack growth for 40 years was very small (less than 50 mils) regardless of the material evaluated. As noted in Section 4.3.1, the projections for 60 years of operation indicate that the numbers of significant transients for IP2 or IP3 will not exceed the design analyzed values. Thus the IP2 and IP3 analyses will remain valid during the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

### 4.7.3 Steam Generator Flow Induced Vibration and Tube Wear

Unit 2

*Summary Description*

The IPEC Unit 2 steam generators were evaluated with respect to flow induced vibration (tube wear) for the power increase. The analysis of the effects of steam generator flow induced vibration on tube wear assumed 40 years of operation.

*Evaluation*

The IP2 replacement steam generators went into service in January 2000 and will thus have less than 40 years of service at the end of the period of extended operation (September 2033). Therefore the analysis of flow induced vibration effects on tube wear will remain valid through the end of the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

Unit 3

*Summary Description*

The IPEC Unit 3 steam generators were evaluated with respect to flow induced vibration (tube wear) for the power increase. The maximum pre-uprate predicted tube wear was 1.3 mils. As a result of the 4.8% uprate, the increase in tube wear is 87%. The post-uprate wear over 40 years is approximately 2.4 mils (~4.9% through-wall wear). This amount of wear will not significantly affect the tube integrity. As the IP3 replacement steam generators went into service in 1989, they will have reached 46.5 years of service at the end of the period of extended operation, 2035. Therefore these analyses are considered TLAA.

*Evaluation*

As the tube wear is a function of time in service, it is appropriate to project the additional wear for the period of extended operation as 46.5/40 times the 40-year wear. Projected wear is 2.8 mils (~5.7% through-wall) by the end of the period of extended operation. This is still well below the allowable 40% through-wall wear depth (20 mils). Hence the period of extended operation will not result in unacceptably high tube wear. Thus, the TLAA associated with Unit 3 tube wear has been projected to the end of the period of extended operation in accordance with 10 CFR 54.21(c)(1)(ii).

### 4.7.4 References

None