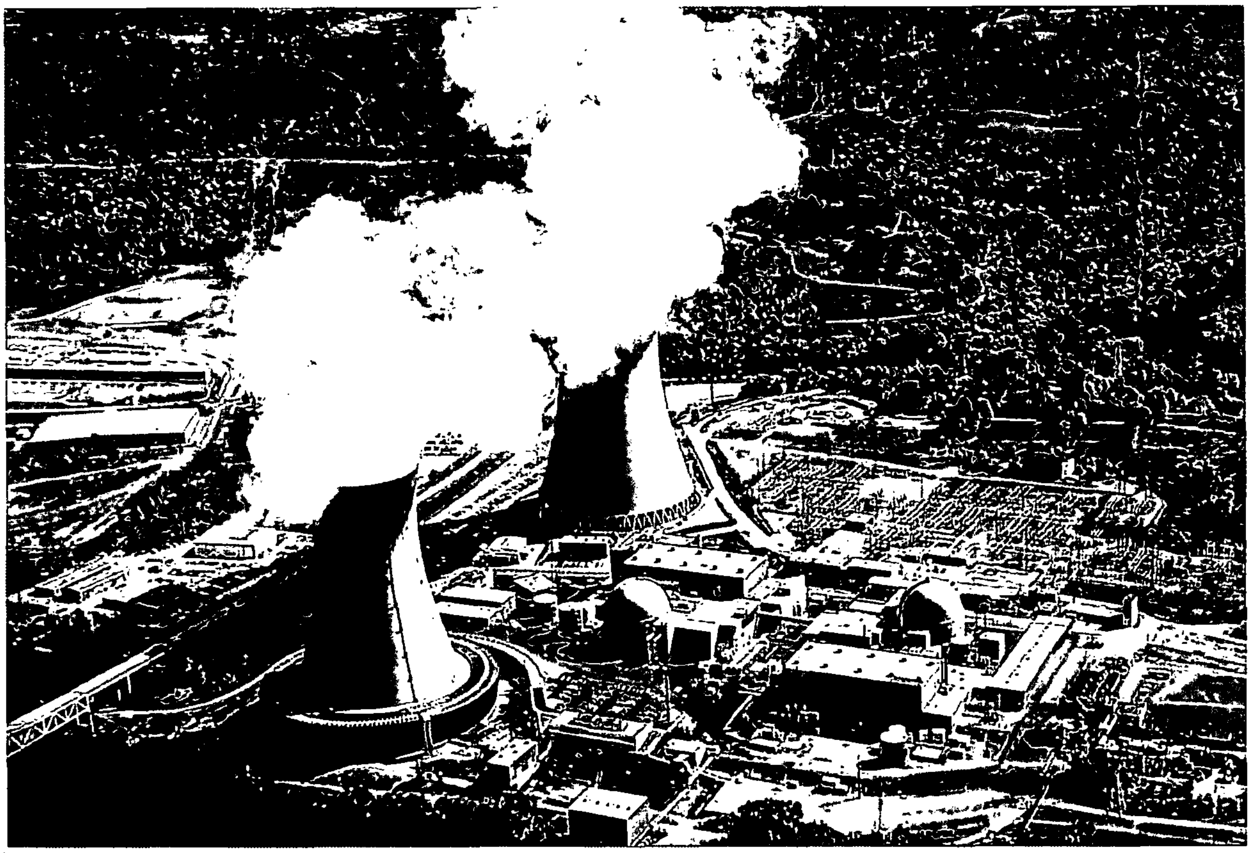
FENOC

FirstEnergy Nuclear Operating Company

Beaver Valley Power Station

August 2007



License Renewal Application

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PREFACE

The following describes the information location, layout, and editorial conventions in the Beaver Valley Power Station (BVPS) License Renewal Application (hereinafter referred to as "this application" or "the application"). 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*, and 10 CFR Part 54, *Requirements for Renewal of Operating Licenses for Nuclear Power Plants* (the license renewal rule), are referred to by the document number, i.e., NUREG-1801 and 10 CFR 54, respectively. References to the UFSAR are to the BVPS Updated Final Safety Analysis Report.

BVPS Unit 1 and Unit 2 are constructed of similar materials with similar environments.. Therefore, the mechanical system and component information presented in this application typically applies to both units, and no unit-specific identifier is listed. However, design differences exist between Unit 1 and Unit 2. Those design differences that impact aging management for each unit are identified by a unit-specific designator ("(Unit 1 only)" or "(Unit 2 only)") in the appropriate section of this application. A "(Common)" designator is listed for cases where a single system, structure, or component is used by both units. Structures information is presented separately by unit.

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 2.2-5. Tables 2.2-1, 2.2-3 and 2.2-4 list mechanical systems, electrical systems and structures, respectively, within the scope of license renewal. Tables 2.2-2 and 2.2-5 list the systems and structures, respectively, not in 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 the 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) Containments, 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 the 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 (TLAAs), 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 based on time-limited aging analyses 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 Unit 1 and Unit 2 evaluation of time-limited aging analyses for the period of extended operation is included. A listing of the Unit 1 and Unit 2 license renewal commitments related to aging management programs and 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 for each unit.

The information in Appendix A fulfills the requirements in 10 CFR 54.21(d).

Appendix B, *Aging Management Programs and Activities*, 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 the BVPS 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 an optional appendix that is not used in this application.

Appendix D, *Technical Specification Changes*, 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, *Applicant's Environmental Report – Operating License Renewal Stage*, 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
ACU	air conditioning unit
AEM	aging effect/mechanism
AMP	aging management program
AMR	aging management review
AMSAC	ATWS Mitigation System Actuation Circuitry
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATWS	anticipated transient without scram
BVPS	Beaver Valley Power Station
BTP	branch technical position
BWR	boiling water reactor
CASS	cast austenitic stainless steel
CAT	chemical addition tank
CDF	core damage frequency
CE	electrical continuity
CFR	Code of Federal Regulations
CLB	current licensing basis
CMAA	Crane Manufacturers Association of America
CO_2	carbon dioxide
CR-15	Unit 1 fuel cask crane
CR-27	Unit 1 moveable platform & hoists crane
CRDM	control rod drive mechanism
CREVS	Control Room Emergency Ventilation System

Abbreviation or Acronym	Description
CRN201	Unit 2 polar crane
CRN215	Unit 2 spent fuel cask trolley
CRN227	Unit 2 moveable platform with hoists
CUF	cumulative usage factor
C_VUSE	Charpy upper shelf energy
DBA	design basis accident
DBE	design basis event
DC	direct current
DF	direct flow
DLCo	Duquesne Light Company
ECCS	emergency core cooling system
EDG	emergency diesel generator
EFPY	effective full power years
El.	elevation
EN	enclosure or protection
EOL	end-of-license (current license life)
EOLE	end-of-license-extended (end of renewed license life)
EPRI	Electric Power Research Institute
EQ	environmental qualification
ER	Applicant's Environmental Report
ERF	Emergency Response Facility
ESF	Engineered Safety Features
EXP	expansion or separation
FB	fire barrier
F_{en}	fatigue life correction factor
FLB	flood barrier
FP	fire protection

Abbreviation or Acronym	Description
ft-lb	foot-pound
GALL	NUREG-1801, *Generic Aging Lessons Learned (GALL) Report*
GL	Generic Letter
GSI	Generic Safety Issue
HELB	high-energy line break
HHSI	high head Safety Injection
HLBS	HELB shielding
HS	heat sink
HVAC	heating, ventilation, and air conditioning
I&C	instrumentation and controls
IASCC	irradiation-assisted stress corrosion cracking
IEB	Inspection and Enforcement Bulletin
IGSCC	inter-granular stress corrosion cracking
IN	Information Notice
INE	insulate (electrical)
INPO	Institute for Nuclear Power Operations
ISG	Interim Staff Guidance
ISI	inservice inspection
ksi	1000 pounds (kilo-pound) per square inch
kV	kilo-volt
LBB	leak before break
LER	licensee event report
LHSI	low head safety injection
LOCA	loss of coolant accident
LRA	license renewal application

Abbreviation or Acronym	Description
LTOP	low-temperature overpressure protection
MB	missile barrier
MIC	microbiologically-influenced corrosion
MWe	megawatts-electric
MWt	megawatts-thermal
N_2	nitrogen
NA	not applicable
NaOH	sodium hydroxide
n/cm^2	neutrons per square centimeter
NDE	non-destructive examination
NDT	nil-ductility transition
NEI	Nuclear Energy Institute
NFPA	National Fire Protection Association
NRC	Nuclear Regulatory Commission
OPPS	Overpressure Protection System
pH	potential hydrogen
PMF	probable maximum flood
ppm	parts per million
PR	pressure relief
P-T	pressure-temperature
PTS	pressurized thermal shock
PW	pipe whip restraint
PWR	pressurized water reactor
PWSCC	primary water stress corrosion cracking
QA	quality assurance

Abbreviation or Acronym	Description
RCCA	rod cluster control assembly
RCS	Reactor Coolant System
RG	Regulatory Guide
RHR	Residual Heat Removal
RIS	Regulatory Issue Summary
RP	gaseous relief path
rpm	revolutions per minute
RPV	reactor pressure vessel
RT	reference temperature
RT_{NDT}	reference temperature for nil-ductility transition
ΔRT_{NDT}	shift in reference temperature for nil-ductility transition
RT_{PTS}	reference temperature for pressurized thermal shock
RVI	Reactor Vessel Internals
RWST	refueling water storage tank
SBO	station blackout
SCC	stress corrosion cracking
SCW	shutdown cooling water
SER	Safety Evaluation Report
SHD	shielding
SG	steam generator
S/G	steam generator
SIS	Safety Injection System
SNS	support for Criterion (a)(2) equipment
SPB	structural pressure barrier
SRE	support for Criterion (a)(3) equipment
SSC	system, structure, or component
SSR	support for Criterion (a)(1) equipment

Abbreviation or Acronym	Description
t/4	one fourth of the way through the vessel wall
TLAA	time-limited aging analysis (analyses)
U_{60}	sixty year cumulative usage factor
U_{env}	cumulative usage factor which includes environmental effects
UFSAR	Updated Final Safety Analysis Report
USE	upper-shelf energy
VAC	volts alternating current
WANO	World Association of Nuclear Operators
WASS	wrought austenitic stainless steel
WCAP	Westinghouse Commercial Atomic Power
Zn	zinc

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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 for Beaver Valley Power Station (BVPS) Unit 1 (DPR-66) and Unit 2 (NPF-73). The Unit 1 operating license expires at midnight, January 29, 2016. The Unit 2 operating license expires at midnight, May 27, 2027. The application also applies to renewal of the source, special nuclear, and by-product materials licenses that are included in the facility operating licenses.

The application is based on guidance provided by the U.S. Nuclear Regulatory Commission (NRC) in NUREG-1800, *Standard Review Plan (SRP) for Review for License Renewal Applications for Nuclear Power Plants*, Revision 1, September 2005, 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 the Nuclear Energy Institute in NEI 95-10, *Industry Guidelines for Implementing the Requirements of 10 CFR 54 - The License Renewal Rule*, Revision 6, June 2005.

This application provides the information and analyses required by 10 CFR Parts 51 and 54 necessary to support renewal of the BVPS Unit 1 and Unit 2 operating licenses for an additional 20 years. Specifically, the application contains technical information required by 10 CFR 54.21, technical specification changes required by 10 CFR 54.22 (no technical specification changes are necessary), and environmental information required by 10 CFR 54.23. The information contained herein provides the NRC with an adequate basis to make the findings required by 10 CFR 54.29.

BVPS Unit 1 and Unit 2 are constructed of similar materials with similar environments. Therefore, the mechanical system and component information presented in this application typically applies to both units, and no unit-specific identifier is listed. However, design differences exist between Unit 1 and Unit 2. Those design differences that impact aging management for each unit are identified by a unit-specific designator ("(Unit 1 only)" or "(Unit 2 only)") in the appropriate section of this application. A "(Common)" designator is listed for cases where a single system, structure, or component is used by both units. Structures information is presented separately by unit.

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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 APPLICANT

FirstEnergy Nuclear Operating Company (BVPS Unit 1 and Unit 2 Operator and Applicant).

FirstEnergy Nuclear Operating Company makes this application acting on its own behalf and as agent for FirstEnergy Nuclear Generation Corp., Ohio Edison Company, and The Toledo Edison Company (licensees).

FirstEnergy Nuclear Generation Corp. (BVPS Unit 1 – 100% Owner; Unit 2 – 60.08% Owner).

Ohio Edison Company (BVPS Unit 2 Licensee with 21.66% leased interest).

The Toledo Edison Company (BVPS Unit 2 Licensee with 18.26% leased interest).

1.1.2 ADDRESS OF APPLICANT

FirstEnergy Nuclear Operating Company
76 South Main Street
Akron, Ohio 44308

FirstEnergy Nuclear Generation Corp.
76 South Main Street
Akron, Ohio 44308

Ohio Edison Company
76 South Main Street
Akron, Ohio 44308

The Toledo Edison Company
76 South Main Street
Akron, Ohio 44308

1.1.3 DESCRIPTION OF BUSINESS OF APPLICANT

FirstEnergy Nuclear Operating Company is engaged principally in the business of operating nuclear generating facilities under the supervision and direction of the owners of the facilities.

FirstEnergy Nuclear Generation Corp. owns nuclear generation assets and sells the output of these assets, including BVPS Unit 1 and Unit 2, to FirstEnergy Solutions Corp.

Ohio Edison Company engages in the distribution and sale of electric energy within a 7,500 square-mile area of central and northeastern Ohio.

The Toledo Edison Company engages in the distribution and sale of electric energy within a 2,500 square-mile area of northwestern Ohio, including the City of Toledo.

1.1.4 LEGAL STATUS AND ORGANIZATION

FirstEnergy Nuclear Operating Company is a wholly owned direct subsidiary of FirstEnergy Corp., a registered public utility holding company. The shares of common stock of FirstEnergy are publicly traded on the New York Stock Exchange and are widely held. The principal offices for FirstEnergy Nuclear Operating Company and FirstEnergy Corp. are located in Akron, Ohio. FirstEnergy Corp. and FirstEnergy Nuclear Operating Company are incorporated in the state of Ohio, and qualified to do business in Pennsylvania.

FirstEnergy Nuclear Generation Corp. is a wholly owned direct subsidiary of FirstEnergy Solutions Corp., and a wholly owned second-tier subsidiary of FirstEnergy Corp. FirstEnergy Solutions Corp. is a wholly owned direct subsidiary of FirstEnergy Corp. The principal offices for FirstEnergy Nuclear Generation Corp. and FirstEnergy Solutions Corp. are located in Akron, Ohio. FirstEnergy Solutions Corp. and FirstEnergy Nuclear Generation Corp. are incorporated in the state of Ohio, and qualified to do business in Pennsylvania. FirstEnergy Solutions Corp. is also qualified to do business in Delaware, Washington, D.C., Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, New York, Oklahoma, Virginia, and West Virginia.

Ohio Edison Company is a wholly owned direct subsidiary of FirstEnergy Corp. Ohio Edison Company is incorporated in the state of Ohio, and qualified to do business in Pennsylvania.

The Toledo Edison Company is a wholly owned direct subsidiary of FirstEnergy Corp. The Toledo Edison Company is incorporated in the state of Ohio, and qualified to do business in Pennsylvania.

FirstEnergy Corp., FirstEnergy Solutions Corp., FirstEnergy Nuclear Generation Corp., FirstEnergy Nuclear Operating Company, Ohio Edison Company, and The Toledo Edison Company are not owned, controlled, or dominated by any alien, foreign corporation, or foreign government.

The names and addresses of the directors and principal officers of FirstEnergy Nuclear Operating Company, FirstEnergy Nuclear Generation Corp., Ohio Edison Company, and The Toledo Edison Company are listed in the following tables. All persons listed are U.S. citizens.

FirstEnergy Nuclear Operating Company Directors	
Anthony J. Alexander	Richard R. Grigg
William T. Cottle	Joseph J. Hagan
Address (common to all above): 76 South Main Street, Akron, OH 44308	

FirstEnergy Nuclear Operating Company Principal Officers	
Name & Title	**Address**
Anthony J. Alexander Chief Executive Officer	76 South Main Street Akron, OH 44308
Joseph J. Hagan President and Chief Nuclear Officer	76 South Main Street Akron, OH 44308
James H. Lash Senior Vice President and Chief Operating Officer	76 South Main Street Akron, OH 44308
Richard H. Marsh Senior Vice President and Chief Financial Officer	76 South Main Street Akron, OH 44308
Danny L. Pace Senior Vice President, Fleet Engineering	76 South Main Street Akron, OH 44308
Leila L. Vespoli Senior Vice President and General Counsel	76 South Main Street Akron, OH 44308
Richard L. Anderson Vice President, Nuclear Support	76 South Main Street Akron, OH 44308
Peter P. Sena, III Vice President, Beaver Valley	Beaver Valley Power Station P.O. Box 4 Shippingport, PA 15077
Mark B. Bezilla Vice President, Davis-Besse	Davis-Besse Nuclear Power Station 300 Madison Toledo, OH 43652

FirstEnergy Nuclear Operating Company Principal Officers	
Name & Title	**Address**
Barry S. Allen Vice President, Perry	Perry Nuclear Plant 10 Center Road Perry, OH 44081
James F. Pearson Vice President and Treasurer	76 South Main Street Akron, OH 44308
Jeannie M. Rinckel Vice President, Fleet Oversight	76 South Main Street Akron, OH 44308
Harvey L. Wagner Vice President and Controller	76 South Main Street Akron, OH 44308
Rhonda S. Ferguson Corporate Secretary	76 South Main Street Akron, OH 44308

FirstEnergy Nuclear Generation Corp. Directors	
Anthony J. Alexander	Joseph J. Hagan
Richard R. Grigg	--
Address (common to all above): 76 South Main Street, Akron, OH 44308	

FirstEnergy Nuclear Generation Corp. Principal Officers	
Name & Title	**Address**
Joseph J. Hagan President and Chief Nuclear Officer	76 South Main Street Akron, OH 44308
James H. Lash Senior Vice President and Chief Operating Officer	76 South Main Street Akron, OH 44308
Richard H. Marsh Senior Vice President and Chief Financial Officer	76 South Main Street Akron, OH 44308
Danny L. Pace Senior Vice President, Fleet Engineering	76 South Main Street Akron, OH 44308
Leila L. Vespoli Senior Vice President and General Counsel	76 South Main Street Akron, OH 44308
James F. Pearson Vice President and Treasurer	76 South Main Street Akron, OH 44308
Jeannie M. Rinckel Vice President, Fleet Oversight	76 South Main Street Akron, OH 44308
Harvey L. Wagner Vice President and Controller	76 South Main Street Akron, OH 44308
Rhonda S. Ferguson Corporate Secretary	76 South Main Street Akron, OH 44308

Ohio Edison Company Directors	
Anthony J. Alexander	Richard H. Marsh
Richard R. Grigg	--
Address (common to all above): 76 South Main Street, Akron, OH 44308	

Ohio Edison Company Principal Officers	
Name & Title	**Address**
Anthony J. Alexander President	76 South Main Street Akron, OH 44308
Richard R. Grigg Executive Vice President and Chief Operating Officer	76 South Main Street Akron, OH 44308
James M. Murray Executive Vice President	76 South Main Street Akron, OH 44308
Richard H. Marsh Senior Vice President and Chief Financial Officer	76 South Main Street Akron, OH 44308
Leila L. Vespoli Senior Vice President and General Counsel	76 South Main Street Akron, OH 44308
Donald R. Schneider Senior Vice President	76 South Main Street Akron, OH 44308
James F. Pearson Vice President and Treasurer	76 South Main Street Akron, OH 44308
Harvey L. Wagner Vice President and Controller	76 South Main Street Akron, OH 44308
Rhonda S. Ferguson Corporate Secretary	76 South Main Street Akron, OH 44308
Steven E. Strah Regional President	1910 W. Market Street Akron, OH 44313

The Toledo Edison Company **Directors**	
Anthony J. Alexander	Richard H. Marsh
Richard R. Grigg	--
Address (common to all above): 76 South Main Street, Akron, OH 44308	

The Toledo Edison Company **Principal Officers**	
Name & Title	**Address**
Anthony J. Alexander President	76 South Main Street Akron, OH 44308
Richard R. Grigg Executive Vice President and Chief Operating Officer	76 South Main Street Akron, OH 44308
James M. Murray Executive Vice President	76 South Main Street Akron, OH 44308
Richard H. Marsh Senior Vice President and Chief Financial Officer	76 South Main Street Akron, OH 44308
Leila L. Vespoli Senior Vice President and General Counsel	76 South Main Street Akron, OH 44308
Donald R. Schneider Senior Vice President	76 South Main Street Akron, OH 44308
James F. Pearson Vice President and Treasurer	76 South Main Street Akron, OH 44308
Harvey L. Wagner Vice President and Controller	76 South Main Street Akron, OH 44308
Rhonda S. Ferguson Corporate Secretary	76 South Main Street Akron, OH 44308
Trent A. Smith Regional President	6099 Angola Road Holland, OH 43528

1.1.5 CLASS AND PERIOD OF LICENSE SOUGHT

FirstEnergy Nuclear Operating Company requests renewal of the Class 104b facility operating license for BVPS Unit 1 (facility operating license DPR-66) for a period of 20 years. License renewal would extend the facility operating license for Unit 1 from midnight, January 29, 2016, to midnight, January 29, 2036. The facility would continue to be known as Beaver Valley Power Station, Unit 1, and would continue to generate electric power during the period of extended operation.

FirstEnergy Nuclear Operating Company requests renewal of the Class 103 facility operating license for BVPS Unit 2 (facility operating license NPF-73) for a period of 20 years. License renewal would extend the facility operating license for Unit 2 from midnight, May 27, 2027, to midnight, May 27, 2047. The facility would continue to be known as Beaver Valley Power Station, Unit 2, and would continue to generate electric power during the period of extended operation.

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.

1.1.6 ALTERATION SCHEDULE

FirstEnergy Nuclear Operating Company does 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 BVPS rates and services are as follows:

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

U.S. Securities and Exchange Commission
100 F Street, NE
Washington, DC 20549

Pennsylvania Public Utility Commission
PO Box 3265
Harrisburg, PA 17105-3265

Public Utilities Commission of Ohio
180 East Broad Street
Columbus, Ohio 43215-3793

1.1.8 LOCAL NEWS PUBLICATIONS

The trade and news publications which circulate in the area surrounding BVPS, 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.

Newsroom
Beaver County Times
400 Fair Avenue
Beaver, PA 15009

Newsroom
Butler Eagle
114 W. Diamond St.
Butler, PA 16001

Newsroom
Pittsburgh Tribune Review
D.L. Clark Building
503 Martindale St., 3rd Floor
Pittsburgh, PA 15212

Newsroom
Pittsburgh Post Gazette
34 Boulevard of the Allies
Pittsburgh, PA 15222

Newsroom
The Intelligencer
1500 Main Street
Wheeling, WV 26003

Newsroom
Hancock County Courier
Jefferson Street
New Cumberland, WV 26047

Newsroom
The Review
210 E. 4th Street
East Liverpool, OH 43920

Newsroom
Morning Journal
308 W. Maple Street
Lisbon, OH 44432

Newsroom
Salem News
161 N. Lincoln Avenue
Salem, OH 44460

Newsroom
Youngstown Vindicator
P.O. Box 780
Youngstown, OH 44501-0780

1.1.9 CONFORMING CHANGES TO STANDARD INDEMNITY AGREEMENT

Regulation 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-73) for BVPS 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 through Amendment No. 13 (effective December 16, 2005), lists BVPS Unit 1 and Unit 2 facility operating license numbers (DPR-66 and NPF-73, respectively). FirstEnergy Nuclear Operating Company has reviewed the original indemnity agreement and Amendments 1 through 13. Neither Article VII nor Item 3 of the attachment specify an expiration date for license numbers DPR-66 or NPF-73. Therefore, no changes to the indemnity agreement are deemed necessary as part of this application. Should the license numbers be changed by NRC upon issuance of the renewed licenses, FirstEnergy Nuclear Operating Company requests that NRC amend the indemnity agreement to include conforming changes to Item 3 of the attachment and other affected sections of the agreement.

1.1.10 RESTRICTED DATA AGREEMENT

This application does not contain restricted data or national security information, and FirstEnergy Nuclear Operating Company does not expect that any activity under the renewed license for BVPS will involve such information. However, if such information were to become involved, FirstEnergy Nuclear Operating Company agrees 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 10 CFR Parts 25 or 95.

1.2 PLANT DESCRIPTION

BVPS Unit 1 and Unit 2 are located along the Ohio River in the Borough of Shippingport in Beaver County, Pennsylvania. The site, comprising approximately 453 acres, is situated on the south bank of the Ohio River approximately 25 miles northwest of Pittsburgh, Pennsylvania. The nearest population center of greater than 20,000 inhabitants is the township of McCandless, Pennsylvania, located approximately 17 miles east of the site.

Both BVPS units employ a three-loop pressurized water reactor nuclear steam supply system furnished by Westinghouse Electric Corporation. The balance of each unit was designed and constructed by the original plant licensees with the assistance of their agent, Stone & Webster Engineering Corporation. The licensed reactor core power is 2900 megawatts-thermal (MWt) for each unit, which corresponds to a gross electrical output of 974 megawatts-electric (MWe) for Unit 1 and 969 MWe for Unit 2.

The Unit 1 UFSAR lists the major Unit 1 structures as the Containment Structure, Cooling Tower, Intake Structure, Auxiliary Building, Fuel Building, Decontamination Building, Turbine Building, Diesel Generator Building, and Service Building (which houses the Unit 1 portion of the common main control room).

The Unit 2 UFSAR lists the major Unit 2 building areas as the Containment Structure, Auxiliary Building, Fuel and Decontamination Building, Safeguards Area, Main Steam and Cable Vault Area, Turbine Building, Service Building, Diesel Generator Building, Waste Handling Building, Condensate Polishing Building, Cooling Tower, Refueling Water Storage Tank Enclosure, Primary Demineralized Water Storage Tank Enclosure, Emergency Outfall Structure, Cooling Tower Pump House, Gaseous Waste Storage Area, and the Control Building (which houses the Unit 2 portion of the common main control room).

The Unit 2 UFSAR lists the Unit 1 facilities shared by Unit 2 as the Intake Structure, Alternate Intake Structure, Control Building, portions of the Service Building, portions of the Auxiliary Building, portions of the Turbine Building, ultimate heat sink, primary grade water storage tanks, Meteorological Tower, interconnecting tunnels, Cooling Tower elevated release point, Potable and Sanitary Water System, Site Drainage System, Fire Protection System, portions of the Communications Systems, and the Emergency Diesel Generators (during a station blackout event). A list of BVPS structures in the scope of license renewal can be found in Table 2.2-4, and a list of BVPS structures not in the scope of license renewal can be found in Table 2.2-5.

Descriptions of the majority of the BVPS systems and structures can be found in the BVPS UFSAR for each unit. Additional descriptive information about the BVPS systems and structures is provided in Section 2 of this application.

1.3 General References

1.3-1 10 CFR 50, *Domestic Licensing of Production and Utilization Facilities.*

1.3-2 10 CFR 51, *Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions.*

1.3-3 10 CFR 54, *Requirements for Renewal of Operating Licenses for Nuclear Power Plants.*

1.3-4 NUREG-1800, *Standard Review Plan (SRP) for Review for License Renewal Applications for Nuclear Power Plants*, Revision 1, September 2005.

1.3-5 NUREG-1801, *Generic Aging Lessons Learned (GALL) Report*, Volumes 1 and 2, Revision 1, U. S. Nuclear Regulatory Commission, September 2005.

1.3-6 Regulatory Guide 1.188, *Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses*, Revision 1, September 2005.

1.3-7 NEI 95-10, *Industry Guidelines for Implementing the Requirements of 10 CFR 54 - The License Renewal Rule*, Revision 6, June 2005.

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 BVPS integrated plant assessment. For those systems, structures, or components (SSCs) within the scope of license renewal, 10 CFR 54.21(a)(1) [Reference 1.3-3] 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 BVPS license renewal review methods are consistent with the approach recommended in Nuclear Energy Institute document NEI 95-10, *Industry Guidelines for Implementing the Requirements of 10 CFR 54 - The License Renewal Rule*, Revision 6 [Reference 1.3-7]. The BVPS integrated plant assessment process consisted of three sub-processes: scoping, screening, and aging management reviews. The integrated plant assessment process was implemented in accordance with site and company procedures and the BVPS Quality Assurance Program.

Chapter 2 provides the following information:

- Scoping and Screening Methodology (Section 2.1)
- Plant-Level Scoping Results (Section 2.2)
- Scoping and Screening Results: Mechanical Systems (Section 2.3)
- Scoping and Screening Results: Structures (Section 2.4)
- Scoping and Screening Results: Electrical and Instrumentation and Controls Systems (Section 2.5)

Table 2.0-1 provides 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. BVPS Unit 1 and Unit 2 are constructed of similar materials with similar environments. Therefore, the mechanical system and component information presented in this application typically applies to both units, and no unit-specific identifier is listed. However, design differences exist between Unit 1 and Unit 2. Those design differences that impact aging management for each unit are identified by a unit-specific designator ("(Unit 1 only)" or "(Unit 2 only)") in the appropriate section of this application. A "(Common)" designator is listed for cases where a single system, structure, or component is used by both units. Structures information is presented separately by unit.

2.0.1 CHAPTER 2 REFERENCES

2.0-1 Regulatory Guide 1.155, *Station Blackout*, dated August 1988.

2.0-2 Branch Technical Position BTP-APCSB 9.5-1, *Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976.*

2.0-3 NFPA-10, *Standard for Portable Fire Extinguishers,* 2007.

2.0-4 NFPA-1962, *Standard for Inspection, Cure, and Use of Fire Hose, Couplings, and Nozzles and the Service Testing of Fire Hose*, 2003.

2.0-5 29 CFR 1910.134, *OSHA's Respiratory Protection Standard*, April 1998.

2.0-6 U.S. Nuclear Regulatory Commission, License Renewal Interim Staff Guidance website, *Interim Staff Guidance Associated with License Renewal Guidance*, http://www.nrc.gov/reading-rm/doc-collections/isg/license-renewal.html.

2.0-7 LR-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.*

2.0-8 LR-ISG-2006-01, *Plant-Specific Aging Management Program for Inaccessible Areas of Boiling Water Reactor Mark I Steel Containment Drywell Shell*, November 16, 2006.

2.0-9 LR-ISG-2006-02, *Proposed Staff Guidance on Acceptance Review for Environmental Requirements.*

2.0-10 LR-ISG-2006-03, *Proposed Staff Guidance for Preparing Severe Accident Mitigation Alternatives (SAMA) Analyses.*

2.0-11 NRC Letter, Pao-Tsin Kuo (NRC) to James H. Riley (NEI), *Final License Renewal Interim Staff Guidance LR-ISG-2006-03: Staff Guidance for Preparing Severe Accident Mitigation Alternatives (SAMA) Analyses*, August 2, 2007.

2.0-12 NEI 05-01, *Severe Accident Mitigation Alternatives (SAMA) Analysis Guidance Document*, November 2005.

2.0-13 LR-ISG-2007-01, *Proposed Updating the LR-ISG Process to Include References to the Environmental Report Guidance Documents, References for the Recent Publication of Revision 1 of the License Renewal Guidance Documents, and Minor Revisions to Be Consistent with Current Staff Practices.*

2.0-14 LR-ISG-2007-02, *Changes to Generic Aging Lessons Learned (GALL) Report Aging Management Program (AMP) XI.E6, "Electrical Cable Connectors Not Subject to 10 CFR 50.49 Environmental Qualification Requirements."*

2.0-15 NRC Safety Evaluation Report, *Safety Evaluation Report Related to the License Renewal of Pilgrim Nuclear Power Station*, June 2007.

2.0-16 NUREG-0933, *A Prioritization of Generic Safety Issues*, Supplement 30, October 2006.

2.0-17 GSI-156.6.1, *Pipe Break Effects on Systems and Components,* Rev. 7.

2.0-18 GSI-163, *Multiple Steam Generator Tube Leakage,* June 16, 1992.

2.0-19 GSI-191, *Assessment of Debris Accumulation on PWR Sump Performance,* Rev. 2.

2.0-20 BVPS Letter L-07-017, Thomas S. Cosgrove (FENOC) to U.S. NRC, *Beaver Valley Power Station, Unit Nos. 1 and 2, BV-1 Docket No. 50-334, License No. DPR-66, BV-2 Docket No. 50-412, License No. NPF-73, License Amendment Requests Nos. 334 and 205*, February 9, 2007.

2.0-21 NRC Generic Letter 2004-02, *Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors,* September 13, 2004.

2.0-22 NRC Office of Inspection and Enforcement Bulletin (IEB) 79-14, *Seismic Analyses for As-built Safety-Related Piping Systems,* August 1, 1979.

Table 2.0-1
Intended Functions: Abbreviations and Definitions

Intended Function	Abbreviation	Definition
Direct flow	DF	Provide control of the distribution or direction of flow (e.g., spray nozzles, and some Reactor Vessel Internals components) [for Mechanical applications] Provide spray shield or curbs for directing flow (e.g., safety injection flow to Containment sump) [for Civil applications]
Electrical continuity	CE	Provide electrical connections to specified sections of an electrical circuit to deliver voltage, current or signals
Expansion / Separation	EXP	Provide for thermal expansion and/or seismic separation
Filtration	Abbreviation not used	Provide filtration
Fire barrier	FB	Provide rated fire barrier to confine or retard a fire from spreading to or from adjacent areas
Flood barrier	FLB	Provide flood protection barrier (internal and external flooding event)
Flow restriction	Abbreviation not used	Provide a restriction to flow to limit flow rates or to provide a pressure difference (e.g., for flow measurement)
Flame suppression	Abbreviation not used	Prevent the spread of fires by preclusion of flame (used on flammable oil storage tank vents)
Gaseous release path	RP	Provide path for release of filtered and unfiltered gaseous discharge
Heat sink	HS	Provide heat sink during station blackout or design basis accidents
Heat transfer	Abbreviation not used	Provide heat transfer
HELB shielding	HLBS	Provide shielding against high energy line break (HELB)
Insulate (electrical)	INE	Insulate and support an electrical conductor

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

Intended Function	Abbreviation	Definition
Leakage boundary (spatial)	Abbreviation not used	Nonsafety-related component that maintains mechanical and structural integrity to prevent spatial interactions that could cause failure of safety-related SSCs
Missile barrier	MB	Provide missile barrier (internally or externally generated)
Pipe whip restraint	PW	Provide pipe whip restraint
Pressure boundary	Abbreviation not used	Provide pressure-retaining boundary so that sufficient flow at adequate pressure is delivered; or, provide fission product barrier for Containment pressure boundary; or, provide Containment isolation for fission product retention. Additionally, for components such as ductwork and fire dampers, the pressure boundary function includes providing a barrier to the spread of fires.
Pressure relief	PR	Provide over-pressure protection
Radiation Shielding [for Mechanical applications] or Shielding [for Civil applications]	SHD	Provide radiation shielding to reduce neutron or gamma radiation fluence
Shelter or Protection	EN	Provide shelter or protection to safety-related equipment (includes high energy line break, radiation shielding)
Shutdown cooling water	SCW	Provide source of cooling water for plant shutdown
Structural / Functional support	Abbreviation not used	Provide structural and/or functional support to ensure system functions are maintained
Structural integrity (attached)	Abbreviation not used	Nonsafety-related component that maintains mechanical and structural integrity to provide structural support to attached safety-related piping and components

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

Intended Function	Abbreviation	Definition
Structural pressure barrier	SPB	Provide pressure boundary or essentially leak tight barrier to protect public health and safety in the event of postulated design basis events
Support for Criterion (a)(1) equipment	SSR	Provide structural or functional support to safety-related equipment
Support for Criterion (a)(2) equipment	SNS	Provide structural or functional support to nonsafety-related equipment whose failure could prevent satisfactory accomplishment of required safety functions (includes seismic II/I considerations)
Support for Criterion (a)(3) equipment	SRE	Provide structural or functional support required to meet the Commission's regulations for any of the regulated events in 10 CFR 54.4(a)(3)

2.1 SCOPING AND SCREENING METHODOLOGY

The BVPS systems, structures, or components (SSCs) scoping and screening approach, process, documents reviewed, and conclusion are described in the following sections:

- Scoping Methodology (Section 2.1.1)
- Screening Methodology (Section 2.1.2)
- Interim Staff Guidance Discussion (Section 2.1.3)
- Generic Safety Issues (Section 2.1.4)
- Conclusion (Section 2.1.5)

2.1.1 SCOPING METHODOLOGY

The license renewal rule (10 CFR 54) defines the scope of license renewal. Regulation 10 CFR 54.4(a) [Reference 1.3-3] requires systems, structures, and components 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 any of the functions identified in paragraphs (a)(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 1.3-7], provides industry guidance for determining which systems, structures and components are in the scope of license renewal. The process used to determine the systems and structures in the scope of license renewal for BVPS followed the recommendations of NEI 95-10.

The BVPS scoping process included a review of current licensing basis and design basis information sources. The following types of controlled plant documents were consulted to support inclusion of systems and structures in the scope of license renewal and for documenting the system and structure descriptions and functions:

- UFSAR;
- BVPS Safety Evaluation Reports;
- BVPS docketed information sources;
- Maintenance Rule Database and Maintenance Rule Basis Documents;

- Design Basis Document Source Documents – Design Basis Documents were not cited as references, but were used to identify other controlled references;
- Plant Engineering Drawings – site plan drawing, plant general arrangement drawings, valve operating number diagrams, piping and instrumentation diagrams, flow diagrams, controlled vendor drawings, isometric drawings, civil drawings, etc.;
- Piping calculations;
- Plant Operating Manuals / Procedures;
- Emergency Operating Procedures and background documents; and,
- Other controlled information sources.

The BVPS mechanical and structural scoping process employed a three-step approach to ensure that systems and structures meeting the criteria of 10 CFR 54.4(a)(1) through (a)(3) were identified. The process was designed to make optimum use of existing plant databases and documents to identify systems and structures in the scope of the Rule.

The first step in the scoping process was to identify the plant population of systems and structures. The scoping process for plant mechanical systems relied on the information contained in the controlled plant equipment database (a subset of the information in the business software application "SAP") to identify the population. The plant equipment database is a relational database that electronically stores selected component information on the majority of onsite equipment which is essential to support the preparation of Work Orders and other plant activities. The database also contains the quality class designation (the "Q" list) for plant equipment. The process for developing the quality class information in the database is well-defined in approved site procedures and controlled under a 10 CFR 50 [Reference 1.3-1], Appendix B quality assurance program.

The scoping process for structures started by developing a list of structures identified in the controlled plant equipment database and in BVPS design and licensing documentation. The list included all structures that could potentially support plant operations.

In the second step of the process, BVPS documented mechanical system and structure descriptions and functions in scoping reports. System and structure functions must be documented so that "intended functions," i.e., a system or structure function required to demonstrate compliance with the requirements of 10 CFR 54.4(a)(1)-(a)(3), can be identified. 10 CFR 54.4(b) states that intended functions provide the basis for including systems, structures and components within the scope of license renewal. Therefore, the BVPS scoping process included identification of system and structure intended functions through a review of controlled plant documents.

The third step of the process required each system and structure and their associated functions to be evaluated against the criteria of 10 CFR 54.4 as described in the following sections:

- Safety-related SSCs (Section 2.1.1.1)
- Nonsafety-related SSCs (Section 2.1.1.2)
- Regulated Event SSCs (Section 2.1.1.3)

If a system function met any of the criteria specified in 10 CFR 54.4(a)(1), (2), or (3), then the function was annotated as a license renewal intended function, and the system or structure was identified as in-scope for license renewal. The critical element of scoping was to ensure that all systems and structures that perform license renewal intended functions were identified and that the basis for this determination was clearly documented.

The scoping process for electrical and instrumentation and controls (I&C) systems differed from that applied to mechanical systems and structures. Plant systems with electrical and I&C components are within the scope of license renewal regardless of the intended function of the system, which is the result of an "encompassing" or "bounding" review for electrical components. Electrical and I&C components in mechanical systems were included in the evaluation of electrical components. See Section 2.5 for additional information on electrical and I&C scoping and screening.

The scoping review performed by BVPS was a comprehensive process that bounded the criteria of 10 CFR 54.4, and was consistent with industry and regulatory guidance. The lists of the systems and structures determined to be within the scope of license renewal are provided in Section 2.2, Tables 2.2-1 through 2.2-5.

2.1.1.1 Application of Criterion for Safety-Related SSCs

A system or structure was included in the scope of license renewal if it is safety-related, which means that it is relied upon to perform a safety function during or following a design basis event. Design basis events (DBEs) are described in 10 CFR 50.49(b)(1)(ii) as conditions of normal operation, including anticipated operational occurrences, design basis accidents (DBAs), external events, and natural phenomena for which the plant must be designed. The DBEs encompassed in the BVPS license renewal scoping process included the following:

- Normal operational transients and anticipated operational occurrences;
- DBAs;
- Design external events and natural phenomena, including barge impacts, dam failures, earthquakes, fire, flooding, high energy line breaks, missiles, oil or chemical spill, tornadoes or high winds, and transport pipeline failure; and,

- Loss of the Intake Structure due to impact and explosion of a gasoline barge. This DBE is mitigated by two nonsafety-related systems: Auxiliary River Water System at Unit 1, and the Standby Service Water System at Unit 2.

The scoping process used two basic means of ensuring that all DBEs were addressed during license renewal scoping evaluation.

1. The safety classification of SSCs was reviewed. The safety classification process identifies SSCs that perform safety-related functions; and,
2. The UFSAR and design basis documents were reviewed directly.

The BVPS definition of safety-related is:

> *Those systems, structures, and components that are relied upon to remain functional during and following design-basis events to ensure the following functions:*
>
> - *The integrity of the reactor coolant pressure boundary;*
> - *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 which could result in potential offsite exposures comparable to the guidelines in 10 CFR 50.34(a)(1), 10 CFR 50.67(b)(2), or 10 CFR 100.11, as applicable.*

This definition matches that of 10 CFR 54.4(a)(1), such that the safety-related classification designation is sufficient to facilitate scoping of SSCs in accordance with 10 CFR 54.4(a)(1).

The plant equipment database includes a field that identifies safety-related components. Systems and structures that contain one or more safety-related components, and which perform any of the requirements of 10 CFR 54.4(a)(1), were considered to be safety-related (Section 2.1.1.2 includes an explanation of a limited number of components in the Turbine Buildings that are designated safety-related for administrative reasons, but do not perform a safety-related function). This list of safety-related systems and structures was the starting point for the identification of in-scope systems and structures. Additionally, License Renewal System Boundary Drawings were highlighted for criterion 10 CFR 54.4(a)(1) based on the safety-related designation of system components and structures.

To confirm the equipment database scoping step, the UFSAR, Engineering documents and Licensing documents were reviewed to evaluate DBE criteria and identify license renewal safety-related intended functions. This review focused on documentation within the current licensing basis that identify the systems and structures that are explicitly relied upon to mitigate design basis events. The documents reviewed provided the system, structure and functional information to identify functions that met the scoping criteria. If a function met the 10 CFR 54.4(a)(1) criterion, it was flagged as a safety-related intended function, and the corresponding system or structure was confirmed to be within the scope of license renewal as safety-related.

Maintenance Rule documents were the initial inputs to this safety-related intended function evaluation process because the safety-related scoping requirements for the Maintenance Rule 10 CFR 50.65(b)(1) match the safety-related scoping requirements of 10 CFR 54.4(a)(1). The UFSAR and docketed information were primary references for evaluation of the current licensing basis for BVPS DBEs.

The review of Engineering and Licensing current licensing basis documents for criterion 10 CFR 54.4(a)(1) intended functions did not identify any additional safety-related SSCs to be included in the scope of license renewal that had not been previously identified by the review of the plant equipment database. Based on the above, the process used by BVPS for scoping safety-related SSCs and for identifying safety-related intended functions provides reasonable assurance that all safety-related SSCs were included in the scope of license renewal, and satisfies the criterion in 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

10 CFR 54.4(a)(2) requires that SSCs within the scope of license renewal include nonsafety-related SSCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1)(i)-(iii).

NEI 95-10, Appendix F, *Industry Guidance on Revised 54.4(a)(2) Scoping Criterion (Nonsafety Affecting Safety)* [Reference 1.3-7], provides the industry guidance to clarify the scoping requirements for 10 CFR 54.4(a)(2). This guidance was endorsed by the NRC in Regulatory Guide 1.188, *Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses* [Reference 1.3-6].

NEI 95-10, Appendix F, states that situations are identified in a plant's current licensing basis where nonsafety-related SSCs may have the potential to prevent satisfactory accomplishment of safety functions. NEI 95-10 also states that, when demonstrating that failures of nonsafety-related systems would not adversely impact the ability to maintain safety-related intended functions, a review must be performed of nonsafety-related systems that are connected to safety-related systems, and of those nonsafety-related systems that are not connected to safety-related systems.

The BVPS scoping process for criterion 10 CFR 54.4(a)(2) started by including all nonsafety-related fluid systems and components that were housed in safety-related structures (includes safety-related "areas") within the scope of license renewal. The scoping process then followed the industry guidance in NEI 95-10, and applied the following categories of nonsafety-related SSCs:

- Nonsafety-related SSCs typically identified in the current licensing basis (Section 2.1.1.2.1)
- Nonsafety-related SSCs directly connected to safety-related SSCs (Section 2.1.1.2.2)
- Nonsafety-related SSCs not directly connected to safety-related SSCs (Section 2.1.1.2.3)

The impact of failures of nonsafety-related systems and components on safety-related systems, structures or components was evaluated as either functional or spatial. A functional failure was defined as one where the failure of a nonsafety-related SSC to perform its normal functions impacts a safety function; this type of failure is identified in the plant's current licensing basis.

A spatial failure was defined as one where a safety function is impacted by the loss of mechanical or structural integrity of a nonsafety-related SSC in physical proximity to a safety-related SSC. Nonsafety SSC failures may result in pipe whip, physical impacts due to high energy system pipe falling due to flow-accelerated corrosion failures, jet impingement, spray or flooding from the nonsafety systems. Spatial failures may be addressed in two ways:

- By evaluating nonsafety-related SSCs directly connected to safety-related SSCs because of the structural support (which includes ensuring that nonsafety-related piping loads are not transferred through the interface) for the safety-related–nonsafety-related interface, or,
- By evaluating nonsafety-related SSCs that are not directly connected to safety-related SSCs or are beyond the first equivalent seismic anchor past the safety/nonsafety interface, but could impact the safety-related SSC due to the possibility of physical interactions between a failed nonsafety-related SSC and a nearby safety-related SSC.

In addition to the review of the plant documentation listed in Section 2.1.1, plant-specific operating experience and industry operating experience specifically applicable to BVPS were evaluated for failures of nonsafety-related systems and components that could affect safety-related SSCs and functions. Plant walk-downs of nonsafety-related systems and components were performed where necessary to confirm information identified during the review of plant documents.

A small number of components are present in the nonsafety-related Turbine Building structures of Unit 1 and Unit 2 that have been assigned safety-related designation in the equipment database for administrative reasons. An Engineering evaluation determined that failure of these components would not prevent satisfactory accomplishment of any safety-related function(s).

Nonsafety-related components in the Turbine Buildings were, therefore, not within the scope of 10 CFR 54.4(a)(2) for spatial interaction concerns with these components.

2.1.1.2.1 Nonsafety-related SSCs Typically Identified in the Current Licensing Basis

Nonsafety-related SSCs in this category are those identified in the current licensing basis that are required to perform a function that supports a safety-related SSC intended function; this category includes certain nonsafety-related mitigative plant design features. Engineering and licensing documents were evaluated to determine the appropriate SSCs in this category.

For mechanical systems, the evaluation of BVPS current licensing basis and other documents confirmed that, with two exceptions, systems required to perform a function in support of other safety-related SSCs are classified as safety-related and were included in the scope of license renewal. The two exceptions were the Unit 1 Auxiliary River Water subsystem, and the Unit 2 Standby Service Water subsystem, which are nonsafety-related systems, but were installed to mitigate a design basis event. The design basis event mitigated by these systems consists of an explosion in conjunction with a gasoline barge impact to the Intake Structure, which requires alternate systems for each unit to provide heat sink requirements if the common Seismic Category I Intake Structure is disabled by the postulated event. Therefore, the Unit 1 Auxiliary River Water subsystem and the Unit 2 Standby Service Water subsystem were included in the scope of license renewal.

For structures (includes associated structural components), with few exceptions, those structures required to perform a function in support of other safety-related SSCs are classified as safety-related and were included in the scope of license renewal. For the few exceptions where nonsafety-related structures are required to remain functional in support of a safety function, the supporting structures were included in the scope of license renewal.

The process used by BVPS for scoping mechanical and structural nonsafety-related SSCs and for identifying the associated nonsafety-related intended functions provides reasonable assurance that the appropriate nonsafety-related SSCs that are identified in the current licensing basis as required to perform a function that supports a safety-related SSC intended function were included in the scope of license renewal.

2.1.1.2.2 Nonsafety-related Systems, Structures, and Components Directly Connected to Safety-Related Systems, Structures, and Components

License renewal guidance document NEI 95-10 [Reference 1.3-7] states the following:

> *For non-safety SSCs directly connected to safety-related SSCs (typically piping systems), the non-safety piping and supports, up to and including the first equivalent anchor beyond the safety/non-safety interface, are within the scope of license renewal per 54.4(a)(2). For this purpose the applicant must define the "first seismic or equivalent anchor" such that the failure in the non-safety related pipe run beyond the first seismic or equivalent anchor will not render the safety-related portion of the piping unable to perform its intended function under CLB* [current licensing basis] *design conditions. The applicant must be able to describe the structures and components that are part of the NSR* [nonsafety-related] *piping segment up to and including the first seismic or equivalent anchor.*

For a nonsafety-related mechanical piping system directly connected to a safety-related piping system, the nonsafety-related system was assumed to provide structural support to the safety-related system, unless otherwise confirmed by a review of the installation details. The entire run of connected nonsafety-related piping was included in scope for 10 CFR 54.4(a)(2) unless one of the following endpoints was identified:

1. A seismic anchor or an "equivalent anchor" (defined as a seismic anchor or group of supports that provide lateral and torsional restraint in three orthogonal directions (the supports were included in scope));
2. A base-mounted (anchored) component (e.g., a pump, heat exchanger, or tank) that is a rugged component and is designed not to impose loads on connecting piping (the component was included in scope);
3. A flexible hose or flexible connection that effectively decouples the piping system (i.e., does not support or transfer loads across the connection to the piping);
4. A free end of nonsafety-related piping, such as a drain pipe that ends at an open floor drain;
5. A point where buried nonsafety-related piping exits the ground - the buried portion of the piping should be included in the scope of

license renewal (the soil at BVPS is well-founded on compacted soil that is not susceptible to liquefaction); or,

6. A smaller branch line where the moment of inertia ratio of the larger piping to the smaller piping is equal to or greater than the acceptable ratio defined by the current licensing basis (requires plant-specific evaluation).

Equivalent anchors (see item 1, above) require documented Design Engineering approval by one of the following methods to be credited as a scoping endpoint for license renewal:

- The limits of a piping stress calculation - the limit of the piping segment evaluated in these calculations encompasses all piping (safety-related and nonsafety-related) needed to provide support to the safety-related piping
- The limits of NRC Office of Inspection and Enforcement Bulletin (IEB) 79-14, *Seismic Analyses for As-built Safety-Related Piping Systems* [Reference 2.0-22], evaluations as shown on isometric or other controlled Engineering drawings. The limits of IEB 79-14 evaluations correspond to the limits of piping stress calculations that demonstrate support of safety-related piping.
- Other approved Design Engineering evaluation and acceptance of an endpoint for scoping that provides documentation that piping beyond the scoping endpoint is not required for support of the safety-related piping components.

Failure in the nonsafety-related piping beyond the equivalent anchor locations or nonsafety-related system support boundaries will not impact structural support for the safety-related piping. These scoping boundaries were determined from the physical installation details, confirmed in most cases by review of design drawings or visual inspection by plant walk-down.

For structures (includes associated structural components), nonsafety-related structures that protect safety-related SSCs were included within the scope of license renewal.

The process used by BVPS for scoping nonsafety-related mechanical and structural SSCs and for identifying the associated nonsafety-related intended functions provides reasonable assurance that the appropriate nonsafety-related SSCs directly connected to safety-related SSCs were included in the scope of license renewal.

2.1.1.2.3 Nonsafety-related Systems, Structures, and Components Not Directly Connected to Safety-Related Systems, Structures, and Components

Per NEI 95-10 [Reference 1.3-7], nonsafety-related systems and components that are not directly connected to safety-related piping or components, or are beyond the first equivalent seismic anchor past the safety/nonsafety interface, and have a spatial relationship such that their failure could adversely impact on the performance of a safety-related SSC's intended function, must be included in license renewal scope in accordance with 10 CFR 54.4(a)(2) requirements.

As described in NEI 95-10, there are two options when performing a scoping evaluation for this category: a mitigative option and a preventive option. The mitigative option involves crediting plant mitigative features (e.g., pipe whip restraints, jet impingement shields, spray and drip shields, seismic supports, or flood barriers) to protect safety-related SSCs from failures of nonsafety-related SSCs. This option requires a demonstration that the mitigating features are adequate to protect safety-related SSCs from failures of nonsafety-related SSCs regardless of failure location. If this level of protection can be demonstrated, then only the mitigative features need to be included within the scope of license renewal.

The preventive option involves identifying the nonsafety-related SSCs that have a spatial relationship such that their failure could adversely impact on the performance of a safety-related SSC intended function, and including the identified nonsafety-related SSC in the scope of license renewal without consideration of plant mitigative features.

BVPS applied the preventive option for 10 CFR 54.4(a)(2) scoping. The preventive option, as implemented, was based on a "spaces" approach for scoping of nonsafety-related SSCs that have a potential for spatial interaction with safety-related SSCs. Potential spatial interaction is assumed in any structure (includes safety-related "areas") that contains active or passive safety-related SSCs.

Fluid-retaining (water, steam or other liquids such as oil or hydraulic fluid) nonsafety-related systems and components that are located inside safety-related structures were included in scope for potential spatial interaction under criterion 10 CFR 54.4(a)(2). Identification of fluid-retaining nonsafety-related piping systems and components present in safety-related structures was performed by review of Engineering drawings (including Operating Manual figures, valve operating number diagrams, flow diagrams, piping and instrumentation drawings, and isometric drawings), equipment locations specified in the controlled operating manual valve lists, and system/component walk-downs, where needed.

Air and gas systems (non-liquid) are not a hazard to other plant equipment, and have, therefore, been determined not to have spatial interactions with safety-related SSCs. Industry and BVPS operating experience has not identified failures due to aging that have adversely impacted the accomplishment of a safety function. SSCs containing air or gas cannot adversely affect safety-related SSCs due to leakage or spray, since gas systems contain no fluids that could spray or leak onto safety-related systems causing shorts or other malfunctions. Thus, the nonsafety-related systems containing air or gas (except portions attached to safety-related SSCs and required for structural support) are not included in the scope of license renewal for 10 CFR 54.4(a)(2). However, all piping and equipment supports (including those for not-in-scope components) within safety-related buildings are within the scope of license renewal.

Some nonsafety-related structural components could affect safety-related SSCs due to their spatial interaction with the SSCs, that is, their physical location can result in interaction upon failure of the nonsafety-related structure. Seismic Category II over I, for example, is a spatial association. Structural components that meet the criterion of 10 CFR 54.4(a)(2) include missile barriers, flood barriers, HELB protection, and nonsafety-related supports for non-seismic (including seismic II/I) piping systems and electrical conduit and cable trays with potential for spatial interaction with safety-related equipment. For example, all equipment supports in safety-related areas were included within the scope of license renewal.

The process used by BVPS for scoping nonsafety-related mechanical and structural SSCs and for identifying the associated nonsafety-related intended functions provides reasonable assurance that the appropriate nonsafety-related SSCs not directly connected to safety-related SSCs were included in the scope of license renewal.

2.1.1.3 Application of Criterion for Regulated Event Systems, Structures, and Components

The scope of license renewal includes all systems, structures, and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Nuclear Regulatory Commission's (the Commission) regulations for:

- Fire protection (10 CFR 50.48) (Section 2.1.1.3.1)

- Environmental qualification (10 CFR 50.49) (Section 2.1.1.3.2)
- Pressurized thermal shock (10 CFR 50.61) (Section 2.1.1.3.3)
- Anticipated transients without scram (10 CFR 50.62) (Section 2.1.1.3.4)
- Station blackout (10 CFR 50.63) (Section 2.1.1.3.5)

This section discusses the approach used to identify the systems in the scope of license renewal based on these requirements.

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

SSCs in the scope of license renewal for fire protection include those based on several different functional requirements defined in 10 CFR 50.48 and 10 CFR 50, Appendix R. 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 establish this scope, a review of the BVPS current licensing basis for fire protection was performed. The following BVPS current licensing basis documents were used to determine those SSCs relied upon to demonstrate compliance with the Commission's regulations for fire protection:

- UFSARs;
- Station procedure for the Fire Protection Program;
- Each unit's Fire Protection Appendix R / Safe Shutdown Report;
- Safety Evaluation Reports (SERs); and,
- Docketed information.

Based on the review of the BVPS current licensing bases for fire protection, SSCs and their corresponding intended functions that are required for compliance with 10 CFR 50.48 were determined.

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

10 CFR 50.49 defines electrical equipment important to safety that is required to be environmentally qualified to mitigate certain accidents that result in harsh environmental conditions in the plant. The BVPS equipment qualification program contains documents that identify electrical equipment and components that are required to function during and subsequent to design basis accidents. The BVPS Unit 1 and Unit 2 Electrical Equipment Qualification Master Lists document the current licensing bases for environmental qualification of equipment at BVPS.

Systems with equipment contained in these lists were included in scope for this criterion. This regulation is not applicable to structures.

Based on the review of the BVPS current licensing bases for environmental qualification, and the bounding scoping approach used for electrical equipment, systems and their corresponding intended functions that are required for compliance with 10 CFR 50.49 were determined.

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

The Pressurized Thermal Shock 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. Review of docketed information did not identify any BVPS systems or structures that are credited for protection against pressurized thermal shock. Protection is afforded by engineering analysis and core design. Specific to the Reactor Vessel, plant conditions are managed to ensure that the reference temperature for nil-ductility transition remains within limits, and no equipment other than the Reactor Vessel is credited with mitigation of pressurized thermal shock.

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

An anticipated transient without scram is an anticipated operational occurrence with a failure of the reactor trip system to shut down the reactor. The anticipated transient without scram 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 anticipated transient without scram event. The BVPS Unit 1 and Unit 2 UFSARs and plant procedures describe the current licensing basis associated with anticipated transient without scram.

Based on the review of the BVPS current licensing bases for anticipated transient without scram, systems and their corresponding intended functions that are required for compliance with 10 CFR 50.62 were determined. Anticipated transient without scram is not applicable to structures.

2.1.1.3.5 Commission's Regulations for Station Blackout (SBO) (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. As defined by 10 CFR 50.2, a station blackout is the loss of offsite and onsite emergency alternating current electric power to the essential and non-essential switchgear buses in a nuclear power plant. It does not include the loss of alternating current power fed from inverters powered by station batteries or by alternate alternating current 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 a station blackout and maintaining adequate reactor core cooling and appropriate Containment integrity for a required duration.

The Station Blackout Shutdown Capability Summaries for each unit, the Unit 1 and Unit 2 UFSARs and docketed information document the current licensing bases for station blackout at BVPS.

BVPS Unit 1 and Unit 2 utilize the opposite unit's Emergency Diesel Generators as an alternate AC power source that meets the independence, performance, and configuration criteria of Regulatory Guide 1.155, *Station Blackout* [Reference 2.0-1]. A cross-tie connecting Unit 1 and Unit 2 4160V normal buses provides the capability to supply either of the emergency buses on one unit from either of the two Emergency Diesel Generators on the other unit. With the cross-tie, BVPS can cope with a postulated total loss of offsite power to both units coincident with the loss of all Emergency Diesel Generator power at one unit, by enabling any single available Emergency Diesel Generator at the opposite unit to supply power to the required station blackout loads at both units 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 four hours.

Based on the review of the BVPS current licensing bases for station blackout, and the bounding scoping approach used for electrical equipment, SSCs and their corresponding intended functions that are required for compliance with 10 CFR 50.63 were determined.

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.*
3. *For each structure and component identified in paragraph (a)(1) of this section, 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 1.3-7] 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 BVPS 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 in the following Sections.

2.1.2.1 Screening of Mechanical Systems

For each mechanical system within the scope of license renewal, the screening process described in this Section 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

Identification of mechanical components subject to aging management review begins by determining the system evaluation boundaries, which define those portions of the mechanical system that are necessary to ensure that the intended functions of the system will be performed. System scoping boundaries established during this process are depicted on license renewal drawings by highlighting. Highlighted components perform functions that correspond to the functions specified in 10 CFR 54.4(a)(1), (a)(2) or (a)(3).

Passive components within these boundaries that are credited in the current licensing basis due to their function in support of a safety-related, nonsafety-related affecting safety, or regulated event function are subject to aging management review and are highlighted in red.

Some nonsafety-related, fluid-retaining components are in scope due to their proximity to safety-related components. These components are located such that their failure could cause an interaction with a safety-related component and will be assigned the NEI 95-10 component function "Leakage Boundary (Spatial)." These nonsafety-related components are highlighted in blue.

Additionally, nonsafety-related piping that is directly connected to safety-related piping may provide support for the safety-related piping. This piping is in scope for the NEI 95-10 "Structural Integrity (Attached)" function, and was highlighted on License Renewal Drawings in green unless the piping also contains fluid and is highlighted in blue.

As noted in Section 4.1 of NEI 95-10, when making the determination that a component is passive (i.e., the component's intended function is performed without moving parts or a change in configuration or properties), it is not necessary to consider the piece-parts of the component. However, in the case of pumps, valves, fans and dampers, the pump casings, valve bodies and fan/ damper housings perform a component intended function of maintaining system pressure boundary integrity, and therefore, are subject to aging management review; whereas the pump impeller, valve discs/stems and fan/damper blades are moving parts and not subject to aging management review. A list of typical passive components is contained in Appendix B of NEI 95-10.

If a component is subject to replacement based on a qualified life or specified time period, then it is short-lived. Replacement may be based on vendor recommendations, plant operating experience or any means that establishes a specific service life, qualified life or replacement frequency under a controlled program. Components that are short-lived should not be included in the aging management review.

Components were typically evaluated within their plant-assigned system. Some components were scoped for license renewal within a system other than their plant-assigned system. Components were grouped with another system for reasons such as consolidating components that support a given system intended function. System assignments are clearly depicted on the drawings by the use of flags with system identifications. Components were not transferred to another system to keep the original system from being in-scope.

Safety-related instrument air solenoid valves (and their associated air tubing) that open to relieve pressure and fail to a safe position upon loss of pressure boundary do not require aging management review because maintaining a pressure boundary is not an intended function for these components.

Some equipment is staged for use in combating fires, or for achieving safe shutdown. This equipment includes smoke ejectors, gasoline storage cans for the engine-driven ejectors, portable electric generators (to power electric smoke ejectors), flexible ductwork for smoke ejectors, extension cords, flashlights, tools, pneumatic jumper hose, wooden wedges for door stops, a spare source range instrument drawer for use during Alternate Safe Shutdown procedure, ladders, and a portable, manual hydraulic pump with associated nitrogen, hose and regulator for manual operation of hydraulically operated valves. The equipment is periodically inventoried and/or tested to ensure its continued availability. As a result, this equipment is replaced on condition, is not long-lived, and, therefore, not subject to aging management review.

Thermal insulation is credited for various specific applications and was included in-scope wherever in-scope piping or structures are located. Thermal insulation was evaluated as a bulk structural commodity in Section 2.4.36.

2.1.2.1.2 Mechanical System Boundary Drawings

Mechanical system License Renewal Drawings were prepared to depict license renewal boundaries:

- Systems or portions of systems that are in scope because they are credited with performing intended functions (excluding spatial concerns) are highlighted in red;
- Blue boundary flags identify inter-system borders and functional boundaries;
- Nonsafety-related systems or portions of systems that are in scope because they retain fluid and are located in safety-related structures are highlighted in blue; and,
- Nonsafety-related piping that is in scope only for mechanical support of safety-related components is highlighted in green.

The License Renewal Drawings were annotated at the safety/nonsafety transitions with notes that describe the portion of the nonsafety piping that is in scope because it provides mechanical or structural support to the safety-related SSC. Numbered footnotes identify the reason that a specific equivalent anchor did not need to be identified (e.g., all of the attached piping was already in scope), and lettered notes correspond to lettered flags showing the location of the associated equivalent anchors.

Each drawing includes a legend that identifies drawing and highlighting conventions.

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 the UFSAR, design basis documents, design drawings, general arrangement drawings, and penetration drawings 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 and other metals;
- Threaded fasteners;
- Concrete;
- Fire barriers;
- Elastomers; and,
- Miscellaneous materials.

Once the structural commodity groups were identified within an in-scope structure or building (e.g., steel, concrete, fire barriers, or elastomers), the groups were subdivided into discrete structural component types based on design (e.g., walls, floors and ceilings, fire doors, flood curbs, equipment supports, penetrations, foundations, or personnel airlocks), since some component types may have different intended functions as defined in 10 CFR 54.4(a)(1-3).

2.1.2.2.2 Evaluation Boundaries

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

2.1.2.2.2.1 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. 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.

2.1.2.2.2.2 Component Supports and Enclosures - Electrical Components

Supports and enclosures for electrical components include cable trays and conduit supports, electrical panels, racks, cabinets, metal enclosed bus enclosures and other enclosures. Supports and enclosures for SBO recovery components include transformer pads, transmission towers, switchyard bus supports, and their associated footings and foundations. The evaluation boundary for these items includes supporting elements, including integral attachments to the building structure.

2.1.2.2.2.3 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 in Section 2.1.2.2.2.1 and Section 2.1.2.2.2.2. 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 evaluated as 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 high energy line break. NEI 95-10 provides guidelines for determining the intended functions of structures, structural components and commodities. These intended functions are listed in Table 2.0-1.

2.1.2.2.4 Structural Boundary Drawings

Unlike mechanical systems, individual license renewal drawings were not created for structures. However, a single drawing based on the site plot plan was created. The license renewal drawing (LR-STRUCTURES) displays the in-scope structures in relation to one another.

2.1.2.3 Screening of Electrical and Instrumentation and Controls Systems

2.1.2.3.1 Passive Screening

Active components are not subject to aging management review per 10 CFR 54.21(a)(1)(i). The ability of active components (e.g., transformers, breakers, relays, or switches) to perform their intended functions is assured through condition and performance monitoring in accordance with the maintenance rule. Electrical cables and connections located inside active component enclosures are considered part of the active component, and are inspected and maintained along with the other subcomponents and piece-parts; therefore, these cables, connections, and other subcomponents are not subject to aging management review.

NEI 95-10, Appendix B, *Typical Structure, Component and Commodity Groupings and Active/ Passive Determinations for the Integrated Plant Assessment*, identifies typical plant components, structures and commodity groups, along with a determination of whether the group is active or passive. The BVPS 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
- Cables and connections, bus, electrical portions of electrical and I&C penetration assemblies, fuse holders outside of cabinets of active electrical structures or components

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 or temperature detectors) was considered in the mechanical aging management reviews, as applicable. Electrical components are supported by structural commodities (e.g., cable trays, electrical penetrations, conduit, or cable trenches), which are included in the structural aging management reviews. However, electrical conductors and connections, such as those in electrical penetration assemblies, are part of the insulated cable and connection commodity group and are subject to aging management review.

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-environmental qualification electrical and I&C components.

Environmental qualification 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 divided into the following four categories for the purpose of license renewal: (a) packing, gaskets, component seals, and O-rings; (b) oil, grease, and component filters; (c) system filters, fire extinguishers, fire hoses, and air packs; and (d) structural sealants. Table 4.1-2 of NEI 95-10 provides a method to address consumables to ensure they have been evaluated consistent with the information presented in Table 2.1-3 of NUREG-1800 [Reference 1.3-4]. Specific bases for exclusion of consumables are discussed in the following subsections.

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 leakproof 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 Boiler and Pressure Vessel Code, Section III, the subcomponents of pressure retaining components are not pressure-retaining parts. Therefore, these subcomponents are not relied on to form a pressure-retaining function and are not subject to aging management review.

2.1.2.4.2 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.

2.1.2.4.3 System Filters, Fire Extinguishers, Fire Hoses, and Air Packs

Components, such as system filters, fire hoses, fire extinguishers, and air packs, are consumables, and are routinely tested, inspected, and replaced when necessary. System filters are monitored during testing and operation and are either replaced periodically or on condition. Fire hoses and fire extinguishers are inspected and hydrostatically tested periodically and must be replaced if they do not pass the test or inspection. Breathing air apparatus and air cylinders are inspected and tested periodically and must be replaced if they do not pass the test or inspection. Fire protection procedures specify the replacement criterion of these components that are routinely checked by tests or inspections to assure operability. Criteria for inspection and replacement are based on accepted industry standards (e.g., Branch Technical Position BTP-APCSB 9.5-1 [Reference 2.0-2], NFPA-10 [Reference 2.0-3] for fire extinguishers, NFPA-1962 [Reference 2.0-4] for fire hoses, and 29 CFR 1910.134 [Reference 2.0-5] for air packs). Therefore, while these consumables are within the scope of license renewal, they do not require an aging management review.

2.1.2.4.4 Structural Sealants

Consumable structural components and commodities are piece-parts of other structural components. Consumables are expended during normal plant operations (i.e., they are short-lived) and replaced based on a qualified life or specified time period, or are replaced based on a justifiable performance or condition monitoring. Although consumables may be part of components or commodities subject to aging management review and important in maintaining the integrity of the component or commodity (i.e., they support the component or commodity intended function), they are not subject to aging management review since they are either periodically replaced or inspected and replaced as needed during preventive maintenance activities.

Limited situations may exist where materials are important in maintaining the integrity of the components to which they are connected. Waterstops perform their functions without moving parts or change in configuration and are not typically replaced or accessible. They support a flood barrier intended function since they form a tight seal against water intrusion under hydrostatic pressure in concrete construction joints. Structural sealants that provide pressure boundary, flood barrier, or fire barrier functions are also not typically replaced at a set schedule. These component types are subject to an aging management review, and are included in the aging management review of bulk commodities (Section 2.4.36).

2.1.3 INTERIM STAFF GUIDANCE DISCUSSION

As discussed in NEI 95-10, the NRC has encouraged applicants for license renewal to address proposed NRC Interim Staff Guidance (ISG) in the license renewal application. The NRC staff has identified several issues for which additional staff and industry guidance or clarification may be necessary. However, with the exception of the ISGs identified in the following paragraphs, the previous Interim Staff Guidance documents have either been incorporated into license renewal guidance documents and closed, or closed with no action required [Reference 2.0-6]. Additional guidance has been incorporated into revised NRC license renewal guidance documents where necessary.

1. **LR-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* [Reference 2.0-7]

   This Interim Staff Guidance is applicable to BVPS. The NRC will promulgate guidance following its review of the proposed industry program. The BVPS *Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program* is addressed in Section B.2.29.

2. **LR-ISG-2006-01**, *Plant-Specific Aging Management Program for Inaccessible Areas of Boiling Water Reactor Mark I Steel Containment Drywell Shell* [Reference 2.0-8].

   The BVPS Containment is a large, dry pressurized water reactor containment and is not of the Mark I boiling water reactor design. Therefore, this Interim Staff Guidance is not applicable to BVPS.

3. **LR-ISG-2006-02**, *Proposed Staff Guidance on Acceptance Review for Environmental Requirements* [Reference 2.0-9]

   This Interim Staff Guidance was issued for comment by the NRC, and the comment period has ended. BVPS performed a review to ensure consistency between Appendix E, *Environmental Report—Operating License Renewal Stage*, and proposed ISG-2006-02.

4. **LR-ISG-2006-03**, *Staff Guidance for Preparing Severe Accident Mitigation Alternatives (SAMA) Analyses* [Reference 2.0-10]

   This Interim Staff Guidance was issued as final, and is applicable to BVPS. NRC sent the Nuclear Energy Institute a letter [Reference 2.0-11] endorsing the guidance of NEI 05-01, *Severe Accident Mitigation Alternatives (SAMA) Analysis Guidance Document* [Reference 2.0-12], in the development of SAMA analyses. The BVPS SAMA analysis provided as part of Appendix E to this application is consistent with the guidance of NEI 05-01.

5. **LR-ISG-2007-01**, *Proposed Updating the LR-ISG Process to Include References to the Environmental Report Guidance Documents, References for the Recent Publication of Revision 1 of the License Renewal Guidance Documents, and Minor Revisions to Be Consistent with Current Staff Practices* [Reference 2.0-13]

   This Interim Staff Guidance is under development by the NRC.

6. **LR-ISG-2007-02**, *Proposed Changes to Generic Aging Lessons Learned (GALL) Report Aging Management Program (AMP) XI.E6, "Electrical Cable Connectors Not Subject to 10 CFR 50.49 Environmental Qualification Requirements"* [Reference 2.0-14]

   This Interim Staff Guidance is under development by the NRC. NRC and the industry discussed this topic at a meeting in November, 2006. BVPS developed the plant-specific program, *Electrical Cable Connections not Subject to 10 CFR 50.49 Environmental Qualification Requirements One-Time Inspection Program* (Section B.2.10), from the discussions during the meeting. BVPS confirmed the program content by comparison to the NRC License Renewal Safety Evaluation Report [Reference 2.0-15] for the Pilgrim Nuclear Power Station.

2.1.4 GENERIC SAFETY ISSUES

In accordance with the guidance in NEI 95-10 and NUREG-1800, Appendix A.3, review of NRC Generic Safety Issues (GSIs) is required as a part of the license renewal process to satisfy the finding required by 10 CFR 54.29. Generic Safety Issues that involve an issue related to the license renewal aging management review (AMR) or time-limited aging analysis (TLAA) evaluations are to be addressed in the license renewal application. Based on NUREG-0933, *A Prioritization of Generic Safety Issues* [Reference 2.0-16], the following Generic Safety Issues are addressed in this application.

1. GSI-156.6.1, *Pipe Break Effects on Systems and Components* [Reference 2.0-17]

   GSI-156.6.1 involves assumed high energy line breaks in which the effects of the resulting pipe break prevent the operation of systems required to mitigate the effects of the break. The aspects of pipe breaks that are associated with degradation are addressed in the aging management review tables associated with mechanical systems in Section 3.0. An evaluation of time-limited aging analyses associated with high energy line breaks is presented in Section 4.7.4, *High Energy Line Break Postulation.*

2. GSI-163, *Multiple Steam Generator Tube Leakage* [Reference 2.0-18]

   GSI-163 involves the potential for multiple steam generator tube leaks during a main steam line break that cannot be isolated. Steam generator tubes are part of the reactor coolant pressure boundary and are the subject of an aging management review and time-limited aging analysis evaluation as documented in Section 3.1.2.1.3 and Section 4.3.1. Aging management of steam generator tubes is addressed within the current licensing basis of the plant and will continue to be addressed during the period of extended operation by the *Steam Generator Tube Integrity Program* discussed in Section B.2.38.

3. GSI-191, *Assessment of Debris Accumulation on PWR Sump Performance* [Reference 2.0-19]

   GSI-191 involves the potential for blockage of containment sump strainers that filter debris from cooling water supplied to the safety injection and containment spray pumps following a postulated LOCA. The issue is based on containment strainer design and on the identification of new potential sources of debris that may block the sump strainers. Refer to BVPS response [Reference 2.0-20] to NRC Generic Letter (GL) 2004-02, *Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors* [Reference 2.0-21]. The issues identified in GSI-191 and Generic Letter 2004-02 are not aging-related issues, and, therefore, are not a license renewal concern for BVPS. Also, the issues are not related to the 40-year term of the current operating license, and, therefore, are not time-limited aging analyses. However, BVPS evaluated the Containment sump, sump liner, and sump screens in the Reactor Containment Building evaluation (See Section 2.4.22). BVPS installed a portion (i.e., increased strainer surface area to approximately 3,300 $ft.^2$) of a Containment sump modification at Unit 2 during the Cycle 12 Refueling Outage (October - November, 2006). BVPS has not yet installed the sump strainer modification at Unit 1. Modifications to the Containment sump based on GL 2004-02 commitments that occur during NRC review of this license renewal application and materially affect the application will be included in an annual update to the application.

2.1.5 CONCLUSION

The methods described in Sections 2.1.1 through 2.1.4 were used at BVPS to identify the SSCs 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).

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2.2 PLANT LEVEL SCOPING RESULTS

Tables 2.2-1, 2.2-3, and 2.2-4 list the mechanical systems, electrical and I&C systems, and structures, respectively, that are within the scope of license renewal for BVPS. 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.

Tables 2.2-2 and 2.2-5 list the systems and structures, respectively, that do not meet the criteria specified in 10 CFR 54.4(a) [Reference 1.3-3] and are therefore excluded from the scope of license renewal. For each system listed in Table 2.2-2, a reference (if applicable) is provided to the section of the UFSAR that describes the system. For structures, a brief description of the building function is provided. None of the structures listed in Table 2.2-5 house safety-related equipment.

The list of systems and structures identified in these tables and determination of system boundaries is based on the plant database (controlled Q" designation list) and documents reviewed during the scoping process described in Section 2.1.1. System (Table 2.2-1) and structure (Table 2.2-4) intended functions are identified in the section referenced in their respective tables. 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 were evaluated and included with the appropriate parent system aging management review. Structural commodities associated with mechanical systems, such as pipe supports and insulation, are evaluated with the structural bulk commodities.

Table 2.2-1
Mechanical Systems
Within the Scope of License Renewal

System Number	System Name	LRA Section
06	Reactor Coolant System	2.3.1.3
06A	Reactor Vessel	2.3.1.1
06B	Reactor Vessel Internals	2.3.1.2
07	Chemical and Volume Control System	2.3.3.5
08	Boron Recovery and Primary Grade Water System	2.3.3.3
09	Reactor Plant Vents and Drains	2.3.3.27
10	Residual Heat Removal System	2.3.2.2
11	Safety Injection System	2.3.2.3
12	Containment Vacuum and Leak Monitoring System	2.3.3.9
13	Containment Depressurization System	2.3.2.1
14A	Reactor Plant Sample System	2.3.3.26
14C	Post-Accident Sample System	2.3.3.22
15	Primary Component and Neutron Shield Tank Cooling Water System	2.3.3.24
16	Supplementary Leak Collection and Release System	2.3.3.32
17	Liquid Waste Disposal System	2.3.3.21
18	Solid Waste Disposal System	2.3.3.31
19	Gaseous Waste Disposal System	2.3.3.20
20	Fuel Pool Cooling and Purification System	2.3.3.19

**Table 2.2-1
Mechanical Systems
Within the Scope of License Renewal
(continued)**

System Number	System Name	LRA Section
21	Main Steam System	2.3.4.7
22	Condensate System (Unit 1 only)	2.3.4.4
24A	Main Feedwater System	2.3.4.6
24B	Auxiliary Feedwater System	2.3.4.1
25	Steam Generator Blowdown System	2.3.4.9
26	Main Turbine and Condenser System	2.3.4.8
27	Auxiliary Steam System	2.3.4.2
29	Chilled Water System	2.3.3.6
30	River Water System (Unit 1 only)	2.3.3.28
30	Service Water System (Unit 2 only)	2.3.3.30
32	Water Treatment System	2.3.4.10
33	Fire Protection System	2.3.3.18
34	Compressed Air System	2.3.3.7
36A	Emergency Diesel Generators and Support Systems	2.3.3.11
41A	Building Services Hot Water Heat System	2.3.4.3
41B	Glycol Heating System (Unit 1 only)	2.3.4.5
41C	Domestic Water System	2.3.3.10
41D	Building and Yard Drains System	2.3.3.4
43	Radiation Monitoring System	2.3.3.25

Table 2.2-1
Mechanical Systems
Within the Scope of License Renewal
(continued)

System Number	System Name	LRA Section
44A	Area Ventilation Systems - Control Area	2.3.3.1
44B	Area Ventilation Systems - Cooling	2.3.3.2
44C	Area Ventilation Systems - Reactor Containment Building	2.3.3.2
44D	Area Ventilation Systems - Auxiliary Building (Unit 2 only)	2.3.3.2
44E	Area Ventilation Systems - Air Conditioning Systems (Unit 1 only)	2.3.3.2
44F	Area Ventilation Systems - Miscellaneous	2.3.3.2
45F	Security Diesel Generator System (Common)	2.3.3.29
46	Post-Design Basis Accident Hydrogen Control System	2.3.3.23
47	Containment System	2.3.3.8
58E	Emergency Response Facility Substation System (Common)	2.3.3.17

Table 2.2-2
Mechanical Systems
Not Within the Scope of License Renewal

System No.	System Name	UFSAR Reference
14B	Turbine Plant Sample System	Unit 1: Section 9.6 Unit 2: Section 9.3.2.2
22A	Condensate System (Unit 2 only)	Unit 2: Section 10.4.7
22B	Condensate Polishing System (Unit 2 only)	Unit 2: Section 10.4.6.2.1
23A	Extraction Steam System	Unit 1: Section 10.3.3.2 Unit 2: Section 10.4.11
23B	Heater Drains System	Unit 1: Section 10.3.5.2.1 Unit 2: Section 10.4.7.2
27B	Auxiliary Boiler System (Unit 2 only)	Unit 2: Section 10.4.10.2
28	Turbine Plant Component Cooling Water System	Unit 1: Section 10.3.9 Unit 2: Section 9.2.7
31	Circulating Water System	Unit 1: Section 10.3.4 Unit 2: Section 10.4.5
35	Main Generator and Transformer System	Unit 1: Section 10.3.3 Unit 2: Section 10.2.2.4; 10.2.2.5
41E	Warehouse Steam Heating System (Unit 1 only)	Unit 1: None
42	Sewage Treatment System	Unit 1: None Unit 2: Section 9.2.4.2
44D	Area Ventilation Systems - Auxiliary Building (Unit 1 only)	Unit 1: Section 9.13.2
44G	Area Ventilation Systems - Condensate Polishing Building (Unit 2 only)	Unit 2: Section 9.4.16
58B	Emergency Response Facility Fire Protection System (Common)	Unit 1: Section 9.10.2.3 Unit 2: None

Table 2.2-2
Mechanical Systems
Not Within the Scope of License Renewal
(continued)

System No.	System Name	UFSAR Reference
58D	Emergency Response Facility Domestic Water System (Common)	Unit 1: None Unit 2: None
58G	Emergency Response Facility Heating, Ventilation and AC System (Common)	Unit 1: None Unit 2: None
59A	South Office Shop Building System (Common)	Unit 1: None Unit 2: None
59B	Primary Access Facility System (Common)	Unit 1: None Unit 2: None
59C	Outbuildings - Waste Handling Building System (Common)	Unit 1: None Unit 2: None

Electrical and Instrumentation and Controls Systems

Because of the bounding approach used for scoping electrical and I&C equipment, electrical and I&C commodities contained in electrical and mechanical systems are in scope by default. Systems with mechanical components that meet the scoping criteria of 10 CFR 54.4 are listed in Table 2.2-1; those systems with mechanical components that are not within the scope of license renewal are listed in Table 2.2-2. Electrical and I&C equipment contained in these mechanical systems are included in the scope of license renewal by the bounding approach. Table 2.2-3 provides the list of electrical and I&C systems that do not include mechanical components, but meet the scoping criteria of 10 CFR 54.4. Descriptions of these electrical systems are not provided. UFSAR Chapters 7 and 8 describe most I&C and electrical systems.

Table 2.2-3
Electrical and Instrumentation & Controls Systems
Within the Scope of License Renewal

System No.	System Name
01	Reactor Control and Protection
02	Reactor Excore Instrumentation
03	Incore Instrumentation System
04	Plant Process Control System
05A	Plant Computer System
05B	Sequence of Events Computer System (Unit 1 only) and Annunciator System (Unit 2 only)
05C	Emergency Response Facility and Safety Parameter Display System
05D	Plant Safety Monitoring System (Unit 2 only)
05E	Emergency Response Data System (Unit 1 only)
05F	Network and Network Devices (Unit 1 only)
36B	4KV Station Service System
37	480 Volt Station Service System

**Table 2.2-3
Electrical and Instrumentation & Controls Systems
Within the Scope of License Renewal
(continued)**

System No.	System Name
38	120 VAC Distribution and Lighting System
39	125 VDC Distribution System
40	Station Communications System
45A	Loose Parts Monitoring System
45B	Anticipated Transient Without Scram Mitigating System - Actuation Circuitry (Unit 1 only) and Seismic Instrumentation System (Unit 2 only)
45C	Grounding System
45D	Electric Heat Tracing System
45E	Fault Recording System
45G	Seismic Instrumentation System (Unit 1 only)
45H	Annunciator Systems (Unit 1 only)
45I	Meteorological Data Monitoring (Unit 1 only)
58C	Plant Variable Computer System (Unit 1 only)
58F	Emergency Response Facility Communications System (Common)
58I	Atmospheric Radioactive Effluent Release Assessment System (Unit 1 only)
75	Miscellaneous System
80	Electrical Grid Equipment Beaver Valley / Midland Substation Switchyard (Common)

Table 2.2-4
Structures
Within the Scope of License Renewal

Structure Name	LRA Section
Alternate Intake Structure (Common)	2.4.1
Auxiliary Building	2.4.2
Boric Acid Tank Building (Unit 1 only)	2.4.3
Cable Tunnel	2.4.4
Chemical Addition Building (Unit 1 only)	2.4.5
Condensate Polishing Building (Unit 2 only)	2.4.6
Control Building (Unit 2 only)	2.4.7
Decontamination Building	2.4.8
Diesel Generator Building	2.4.9
Emergency Outfall (Unit 2 only)	2.4.10
Emergency Response Facility Substation Building (Common)	2.4.12
Emergency Response Facility Diesel Generator Building (Common)	2.4.11
Equipment Hatch Platform	2.4.13
Fuel Building	2.4.14
Gaseous Waste Storage Vault	2.4.15
Guard House (Common)	2.4.16
Intake Structure (Common)	2.4.17
Main Steam and Cable Vault	2.4.18
Pipe Tunnel	2.4.19

Table 2.2-4
Structures
Within the Scope of License Renewal

Structure Name	LRA Section
Primary Demineralized Water Storage Tank Pad and Enclosure	2.4.20
Primary Water Storage Building (Unit 1 only)	2.4.21
Reactor Containment Building	2.4.22
Refueling Water Storage Tank and Chemical Addition Tank Pad and Surroundings	2.4.23
Relay Building (Common)	2.4.24
Safeguards Building	2.4.25
Service Building	2.4.26
Solid Waste Building (Unit 1 only)	2.4.27
South Office and Shops Building (Common)	2.4.28
Steam Generator Drain Tank Structure (Unit 1 only)	2.4.29
Switchyard (Common)	2.4.30
Turbine Building	2.4.31
Valve Pit	2.4.32
Waste Handling Building (Unit 2 only)	2.4.33
Water Treatment Building (Unit 1 only)	2.4.34
Yard Structures	2.4.35

Table 2.2-5
Structures
Not Within the Scope of License Renewal

Structure Name	Function
Administration Building (Common)	Houses administrative offices.
Alternate Access Facility (Common)	No longer used as the access point. Formerly, provided access into the protected area in addition to the Primary Access Facility.
Chlorine Building (Unit 1 only)	No longer supports plant or equipment operation; previously, it housed chlorine for water treatment.
Cooling Tower	The cooling tower reduces the temperature of the circulating water that flows through the main condenser tubes. The tower's collapse would not affect any in-scope SSCs.
Cooling Tower Pump House	Houses the Cooling Tower circulating water pumps.
Discharge Structure (Common)	Provides normal flowpath for plant discharge.
Emergency Response Facility (Common)	Houses facilities related to emergency response.
Foam House (Unit 1 only)	No longer supports plant or equipment operation. Formerly housed fire protection equipment for the Unit 1 auxiliary boiler fuel oil tank.
Generation Distribution Center (Common)	Regional warehouse facility.
In-Plant Administration Building (Common)	Houses administrative offices.
Meteorological Tower (Common)	Supports instruments that provide information on weather and atmospheric conditions.
North Pipe Trench (Common)	Houses nonsafety-related, cross-tie piping connecting the Unit 1 Turbine Building with the Unit 2 Pipe Tunnel.
Nuclear Construction Building (Common)	Houses offices/shops for plant staff.

Table 2.2-5
Structures
Not Within the Scope of License Renewal

Structure Name	Function
Old Steam Generator Storage Facility (Unit 1 only)	Stores steam generators and Reactor Vessel head removed from Unit 1, and provides storage space for future removal of Unit 2 Reactor Vessel head.
Paint Shop (Common)	Used for painting and storing paint.
Perimeter Observation Towers	Multiple towers from which the plant's perimeter fencing is observed.
Personnel Walkway (Common)	Bridge between Unit 1 and Unit 2.
Primary Access Facility (Common)	Provides personnel access to the protected area.
SAPS Warehouse (Common)	Houses plant inventory and equipment.
Simulator Addition (Common)	Houses plant simulator classrooms and offices.
Simulator Building (Common)	Houses plant simulator classrooms and offices.
Site Engineering Building (Common)	Houses offices for plant staff.
South Pipe Trench (Common)	Houses nonsafety-related, cross tie piping connecting the Unit 1 Fuel Building with the Unit 2 Condensate Polishing Building.
Storeroom (Unit 1 only)	Houses maintenance supplies.
Substation Electrical Equipment Shed	Houses nonessential electrical equipment.
Training Building (Common)	Houses classrooms and offices.
VHF Radio Building (Common)	Houses two base radios associated with the remote VHF consoles.
Warehouse (Common)	Houses plant inventory and equipment.
Warehouse A (Common)	Houses plant inventory and equipment.
Warehouse B (Common)	Houses plant inventory and equipment.

Table 2.2-5
Structures
Not Within the Scope of License Renewal

Structure Name	Function
Warehouse C (Common)	Houses plant inventory and equipment.
Warehouse D (Common)	Houses plant inventory and equipment.
Waste Handling Building (Switchyard) (Common)	Houses waste handling equipment.
Weld Shop (Unit 1 only)	Houses welding tools and equipment used for steel component fabrication.

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2.3 SCOPING AND SCREENING RESULTS: MECHANICAL SYSTEMS

The license renewal scoping and screening results for BVPS mechanical systems are detailed in the following four sub-sections of Section 2.3:

- Reactor Vessel, Internals, and Reactor Coolant System (Section 2.3.1)
- Engineered Safety Features (Section 2.3.2)
- Auxiliary Systems (Section 2.3.3)
- Steam and Power Conversion Systems (Section 2.3.4)

Specifically, this section provides the following information for the BVPS mechanical systems within the scope of license renewal listed in Table 2.2-1:

1. The system description;
2. A list of license renewal intended functions, including which criteria of 10 CFR 54 require the system to be in-scope;
3. Reference to the applicable BVPS UFSAR section(s);
4. Reference to the applicable license renewal boundary drawing(s); and,
5. A list of mechanical component types that are subject to an aging management review with their associated component intended function(s).

Unless otherwise stated, the information provided in this section is applicable to BVPS Unit 1 and Unit 2.

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2.3.1 REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEM

The following systems are included in this section.

- Reactor Vessel (Section 2.3.1.1)
- Reactor Vessel Internals (Section 2.3.1.2)
- Reactor Coolant System (Section 2.3.1.3)

2.3.1.1 Reactor Vessel

System Description

The Reactor Vessel is a vertical, cylindrical pressure vessel that has a welded hemispherical bottom head, and a removable bolted, flanged and gasketed hemispherical upper closure head. The vessel contains the core, core support structures, control rods, and other vessel internals directly associated with the core. There are three inlet nozzles and three outlet nozzles spaced evenly around the vessel through which reactor coolant flows into and out of the Reactor Vessel. The vessel is supported by pads on the bottom of each of these six nozzles.

The reactor vessel closure head contains penetrations for the control rod drive mechanisms and core instrumentation. Note that the closure head for Unit 1 was replaced during refueling outage 17 in the Spring of 2006. The bottom head of the vessel contains penetrations for the in-core instrumentation.

Internal surfaces of the Reactor Vessel that are in contact with primary coolant are clad with a weld overlay of stainless steel. The exterior of the Reactor Vessel is insulated with canned stainless steel reflective sheets (Unit 1 and Unit 2) and canned borated fiberglass (Unit 2 only).

System Intended Functions

10 CFR 54.4(a)(1):

- Serves as a pressure boundary for containing reactor coolant;
- Provides a barrier against the release of radioactivity;
- Supports and contains the reactor core and core support structures; and,
- Supports and guides reactor controls and instrumentation.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Mitigates thermal shock (PTS).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 4.2.2	Section 5.3.3

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-06-1	**LR 2-06-1**
LR 1-06-4	**LR 2-06-2**

Components Subject to Aging Management Review

Table 2.3.1-1 lists the component types that require aging management review and their intended functions.

Table 3.1.2-1, *Reactor Vessel, Vessel Internals, and Reactor Coolant System – Reactor Vessel – Summary of Aging Management Evaluation*, provides the results of the aging management review.

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

Component Type	Intended Function
Bottom-mounted guide tube	Pressure boundary Structural/Functional support
Closure head	Pressure boundary Structural/Functional support
Core support pad and core guide lug	Structural/Functional support
Head penetration	Pressure boundary
Nozzle safe end and weld	Pressure boundary
Nozzle	Pressure boundary Structural/Functional support
Penetration	Pressure boundary
Refueling seal ledge ring	Pressure boundary
Vessel shell	Pressure boundary Structural/Functional support

2.3.1.2 Reactor Vessel Internals

System Description

The Reactor Vessel Internals consist of three major assemblies: the lower core support structure (also known as the "lower internals"), the upper core support structure (also known as the "upper internals"), and the in-core instrumentation support structure (includes components that are part of the "upper internals" or the "lower internals"). These assemblies provide a number of functions, such as: core support; aligning, guiding and limiting movement of core components; directing coolant flow; and, providing shielding.

The lower core support structure assembly consists of the core barrel, the core baffle, the lower core plate and support columns, the thermal shield or neutron shield pads, and the core support, which is welded to the core barrel. The lower core support structure is supported at its upper flange from a ledge in the Reactor Vessel and its lower end is restrained from transverse motion by a radial support system attached to the vessel wall. Within the core barrel are an axial baffle and a lower core plate, both of which are attached to the core barrel wall and form the enclosure periphery of the assembled core. The lower core support structure and core barrel provide passageways and control for coolant flow. The lower core plate is positioned at the bottom level of the core below the baffle plates, and provides support and orientation for the fuel assemblies.

Unit 1 uses a one piece thermal shield that is fixed to the core barrel at the top with rigid bolted connections. Rectangular specimen guides in which material samples can be inserted and irradiated during reactor operation are welded to the outside of the thermal shield and extend to the top of the thermal shield. Unit 2 uses a neutron shield pad assembly consisting of four pads that are bolted and pinned to the outside of the core barrel. Specimen guides, in which material surveillance samples can be inserted and irradiated during reactor operation, are attached to the outside of the pads.

The upper core support assembly consists of the upper support assembly and the upper core plate between which are contained support columns and rod cluster control assembly (RCCA) guide tube assemblies. The support columns establish the spacing between the upper support assembly and the upper core plate, and are fastened at the top and bottom to these plates. The support columns transmit the mechanical loadings between the upper support and upper core plate. The support columns also serve as a passageway for thermocouples.

The RCCA guide tube assemblies shield and guide the control rod drive shafts and control rods. The guide tube assemblies 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 upper guide tube, which is attached to the upper support plate and guide tube.

The in-core instrumentation support structures consist of an upper system (components of which are part of the "upper internals") to convey and support thermocouples penetrating the vessel through the head, and a lower system (components of which are part of the "lower internals") to convey and support flux thimbles penetrating the vessel through the bottom. The upper system contains instrumentation port columns which are slip-connected to in-line columns that are in turn fastened to the upper support plate. The thermocouples are carried through these port columns and the upper support plate at positions above their readout locations.

The lower in-core instrumentation support system uses Reactor Vessel bottom-mounted instrumentation columns (flux thimble guide tubes) which guide and protect the retractable, cold worked stainless steel flux thimbles that are pushed upward into the reactor core. The thimbles are closed at the leading ends and serve as the pressure barrier between the reactor pressurized water and the Containment atmosphere.

All reactor internals are removable from the vessel for the purpose of their inspection as well as the inspection of the vessel internal surface.

System Intended Functions

10 CFR 54.4(a)(1):

- Directs the main flow of coolant through the core;
- Provides for secondary flows for cooling of the Reactor Vessel and internals;
- Maintains fuel alignment and limits fuel assembly movement;
- Provides gamma and neutron shielding;
- Provides guides for the incore instrumentation;
- Supports the reactor core; and,
- Provides support, orientation, guidance and protection of the RCCAs.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3): None

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 3.2.2	Section 3.9N.5

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-06-1	**LR 2-06-1**

Components Subject to Aging Management Review

Table 2.3.1-2 lists the component types that require aging management review and their intended functions.

Table 3.1.2-2, *Reactor Vessel, Vessel Internals, and Reactor Coolant System – Reactor Vessel Internals – Summary of Aging Management Evaluation*, provides the results of the aging management review. I

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

Component Type	Intended Function
Core baffle / former assembly	Direct flow Structural / functional support
Core barrel assembly	Direct flow Radiation shielding Structural / functional support
Instrumentation support structure	Structural / functional support
Lower internals assembly	Direct flow Structural / functional support
RCCA guide tube assemblies	Structural / functional support
Upper internals assembly	Structural / functional support

2.3.1.3 Reactor Coolant System

System Description

The purpose of the safety-related Reactor Coolant System (RCS) is to transfer the heat generated in the reactor core to the steam generators, where steam is produced to drive the turbine generator. The RCS consists of three similar heat transfer loops connected in parallel to the Reactor Vessel. Each loop contains an identical reactor coolant pump, inlet and outlet loop isolation valves, a steam generator, and interconnecting piping to various auxiliary or safety systems. The system also includes a pressurizer, connecting piping, pressurizer safety and relief valves, and pressurizer relief tank, which are necessary for operational pressure control. Borated demineralized water is circulated in the system and acts as a neutron moderator and reflector, as a solvent for chemical shim control in the reactor core, and as a heat transfer medium.

During normal operation, coolant exiting the core is routed through tubes in the steam generator where heat is removed by cooler secondary system water, which is heated sufficiently to form a steam-water mixture. After leaving the steam generator, the reactor coolant flows into the reactor coolant pump and is discharged through a nozzle on the side of the pump. After leaving the pump, the coolant enters the cold leg inlet nozzles of the Reactor Vessel to begin the thermal cycle over again.

The Pressurizer and Pressure Relief Subsystem is connected to the RCS by a surge line on the loop "C" hot leg to accommodate volume changes of the reactor coolant due to changes in coolant temperature. The Pressurizer and Pressure Relief Subsystem maintains pressure in the RCS by the use of electric heaters, and prevents over pressurization of the RCS by spraying water into the steam volume to condense steam, and by actuation of power operated relief valves and safety valves. Two spray lines are provided to the Pressurizer, one from each of two separate cold leg sources, to allow spraying of the pressurizer steam volume with relatively cooler reactor coolant to minimize pressure increases beyond the control setpoint.

Unit 1 also has a reactor coolant gas vent system (a subsystem of the RCS) designed to vent gases from the reactor vessel head or pressurizer steam space during post-accident situations if large quantities of non-condensable gases collect in these high points. The system provides a vent path to the pressurizer relief tank or direct venting to Containment atmosphere. The reactor coolant gas vent system may also be used as an alternate letdown path to support post-fire safe shutdown. Unit 2 has a Reactor Vessel head vent system (a subsystem of the RCS for license renewal evaluations) that provides for the removal of non-condensable gases and for additional letdown capability from the RCS.

System Intended Functions

10 CFR 54.4(a)(1):

- Serves as a pressure boundary to contain reactor coolant and limits the release of fission products;
- Provides the means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97;
- Provides RCS pressure control and limits pressure transients;
- Provides the borated water used as the core neutron moderator and reflector, and for chemical shim control;
- Provides the capability to monitor water level in the Reactor Vessel;
- Provides inputs to the Solid State Protection System;

- Provides a Containment isolation function;
- Provides for the removal of the thermal energy produced by the core and its transfer to the steam generators from power operation through cold shutdown;
- Provides for reactor core cooldown by natural circulation and reflux condensation in the steam generator tubes;
- Provides indication of the margin to saturation of the primary coolant;
- Provides for venting non-condensable gases that inhibit core cooling following an accident using the reactor coolant gas vent system (Unit 1 only); and,
- Provides for the removal of non-condensable gasses and for additional letdown capability from the RCS using the Reactor Vessel head vent system (Unit 2 only).

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related systems, structures and components; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related areas prevents interactions that could affect safety-related systems, structures and components.

10 CFR 54.4(a)(3):

- Contains systems, structures and components relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ;
- Provides RCS Isolation to maintain RCS inventory to ensure that the core is cooled for the required coping duration (SBO);
- Provides for reactor core cooldown by natural circulation and reflux condensation in the steam generator tubes (SBO);
- Provides for the removal of the thermal energy produced by the core and its transfer to the steam generators from power operation through cold shutdown (FP);
- Provides alternate letdown flow path via the reactor coolant gas vent system during alternate safe shutdown (FP) (Unit 1 only);
- Provides alternate letdown flow path via the Reactor Vessel head vent system during alternate safe shutdown (FP) (Unit 2 only); and,
- Provides means for depressurizing the RCS during temperature reduction during shutdown following a plant fire (FP) (Unit 2 only).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 4.2	Section 5.1

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-06-1	**LR 2-06-1**
LR 1-06-2	**LR 2-06-2**
LR 1-06-3	**LR 2-06-5**
LR 1-06-4	LR 2-07-1A
LR 1-07-1	LR 2-07-3
LR 1-07-4	LR 2-09-1
LR 1-09-1	LR 2-10-1
LR 1-10-1	LR 2-11-1
LR 1-11-1	LR 2-11-2
LR 1-11-2	LR 2-15-3
LR 1-15-5	LR 2-21-1
LR 1-21-1	LR 2-24-2A
LR 1-24-1	LR 2-25-1
LR 1-25-1	--

Components Subject to Aging Management Review

Table 2.3.1-3 lists the component types that require aging management review and their intended functions.

Table 3.1.2-3, *Reactor Vessel, Vessel Internals, and Reactor Coolant System – Reactor Coolant System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.1-3
Reactor Coolant System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Flexible hose (Unit 2 only)	Leakage boundary (spatial) Pressure boundary
Heat exchanger (Unit 1 only)	Heat transfer Pressure boundary
Hydraulic isolator	Pressure boundary
Orifice	Flow restriction Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Pressurizer	Pressure boundary Structural / functional support
Pressurizer relief tank	Leakage boundary (spatial) Structural integrity (attached)
Reactor coolant pump	Heat transfer Pressure boundary
Steam generator	Direct flow Flow restriction Heat transfer Pressure boundary Structural/functional support
Thermal sleeve	Pressure boundary

Table 2.3.1-3
Reactor Coolant System
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Tubing	Leakage boundary (spatial) Pressure boundary
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

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2.3.2 ENGINEERED SAFETY FEATURES

The following systems are included in this section.

- Containment Depressurization System (Section 2.3.2.1)
- Residual Heat Removal System (Section 2.3.2.2)
- Safety Injection System (Section 2.3.2.3)

2.3.2.1 Containment Depressurization System

System Description

The purpose of the safety-related Containment Depressurization System is to cool and depressurize the Containment following a design basis accident. In addition, the system is capable of reducing and maintaining pressure in the Containment for an extended period of time following the design basis accident. The system also removes fission products from the Containment environment following a primary system break.

The Containment Depressurization System is composed of two subsystems: the Quench Spray System, and the Recirculation Spray System.

The Quench Spray System is designed to provide cold water from the refueling water storage tank (RWST), chemically treat the water and spray the Containment. The system is made up of two separate, parallel, 100% capacity trains, each consisting of a quench spray pump discharging to spray headers located near the top of the reactor Containment, and the associated piping and valves. Sodium hydroxide solution is added to the quench spray from the chemical addition tank (CAT) to improve removal of radioactive iodine from the Containment atmosphere and to control Containment sump pH.

The Recirculation Spray System provides a means for long-term cooling. It consists of four 50-percent capacity pumps which recirculate water from the Containment sump through heat exchangers to spray Containment after a Containment Isolation Phase B signal and predetermined time delay. The time delay, which allows time for the Containment sump to be filled by the Quench Spray System and primary plant leakage, ensures adequate net positive suction head is available for the pumps. The water from the sump is recirculated through recirculation spray heat exchangers where it is cooled by the River Water (Unit 1 only) or Service Water (Unit 2 only) system. The cooled water is then used to spray the Containment and the cycle repeats itself for an extended period.

The Unit 2 recirculation spray system also functions to provide water from the Containment sump to the RCS and to the Safety Injection System during the recirculation phase. The Unit 1 recirculation spray pumps can provide a backup supply to the suction of the charging pumps in the event of a failure of the Low Head Safety Injection Pumps.

The Containment sump was evaluated as part of the Reactor Containment Building in Section 2.4.22.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides Containment isolation function;
- Provides means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97;
- Provides inputs to the Solid State Protection System for transfer from injection to recirculation mode of operation;
- Provides required supply of borated water to the quench spray, and low head and high head safety injection trains;
- Removes radioactive iodine from Containment atmosphere and controls the Containment sump pH level through the storage and addition of sodium hydroxide to the spray fluid;
- Provides positive seal against leakage of radioactive fluid;
- Quench and Recirculation Spray Subsystems are sized to depressurize the Containment following a loss-of-coolant accident (LOCA);
- Provides for cooling and depressurizing the Containment following a DBA and Containment spray actuation signal;
- Removes heat from the Containment for an extended period of time;
- Provides the means to supply Containment sump water to the suction of the high head safety injection pumps; and,
- Provides the means to recirculate Containment sump water directly to the RCS (Unit 2 only).

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ; and,
- Provides make-up water from the RWST to the RCS for Appendix R Safe Shutdown (FP) and SBO.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 6.4	Section 6.2.2

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-11-1	LR 2-11-1
LR 1-13-1	**LR 2-13-1**
LR 1-13-2	**LR 2-13-2**
LR 1-15-5	LR 2-14C-1
LR 1-29-1	LR 2-29-3
LR 1-30-3	LR 2-30-3

Components Subject to Aging Management Review

Table 2.3.2-1 lists the component types that require aging management review and their intended functions.

Table 3.2.2-1, *Engineered Safety Features Systems – Containment Depressurization System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.2-1
Containment Depressurization System
Components Subject to Aging Management Review

Component Type	Intended Function(s)
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Flexible hose	Leakage boundary (spatial) Pressure boundary
Heat exchanger	Heat transfer Leakage boundary (spatial) Pressure boundary
Orifice	Flow restriction Leakage boundary (spatial) Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Pump casing	Leakage boundary (spatial) Pressure boundary
Spray nozzle	Direct flow
Strainer body	Leakage boundary (spatial) Pressure boundary
Strainer element	Filtration
Tank	Pressure boundary
Tubing	Leakage boundary (spatial) Pressure boundary
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.2.2 Residual Heat Removal System

System Description

The purpose of the safety-related Residual Heat Removal (RHR) System is to transfer heat from the Reactor Coolant System (RCS) to the Primary Plant Component Cooling Water System to reduce the temperature of the reactor coolant to the cold shutdown temperature at a controlled rate during normal plant cooldown and maintain this temperature until the plant is started up. The system also transfers refueling water from the refueling cavity and transfer canal to the RWST at the end of refueling operations.

The RHR System consists of two redundant subsystems, each of which includes one pump and one heat exchanger, and associated piping and valves. During system operation, reactor coolant is pumped from an RCS hot leg through the RHR heat exchangers (where it is cooled by Primary Plant Component Cooling water), and then returned to RCS cold leg connections via the Safety Injection System accumulator discharge piping.

System Intended Functions

10 CFR 54.4(a)(1):

- Forms a part of the RCS pressure boundary;
- Provides means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97;
- Provides protection against over-pressurization and rupture of ECCS low pressure piping that could result in a loss of coolant accident;
- Provides Containment isolation function;
- Provides pressure relief for the RHR System while in operation; and,
- Provides means to remove reactor core decay heat and sensible heat from the RCS in order to achieve and maintain cold shutdown (Unit 2 only).

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ; and,

- Provides the means to remove reactor core decay heat and sensible heat from the RCS in order to achieve and maintain cold shutdown (FP) (Unit 2 only).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 9.3	Section 5.4.7

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-07-1	LR 2-07-1A
LR 1-10-1	**LR 2-10-1**
LR 1-15-5	LR 2-14A-2
--	LR 2-15-2

Components Subject to Aging Management Review

Table 2.3.2-2 lists the component types that require aging management review and their intended functions.

Table 3.2.2-2, *Engineered Safety Features Systems – Residual Heat Removal System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.2-2
Residual Heat Removal System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Flexible Hose	Pressure boundary
Heat Exchanger	Heat Transfer Pressure Boundary
Orifice	Flow restriction Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Pump Casing	Pressure boundary
Tubing	Pressure boundary
Valve Body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.2.3 Safety Injection System

System Description

The purpose of the Safety Injection System (SIS) is to provide emergency cooling to the reactor core. The system is safety-related and is primarily comprised of pumps, tanks, valves, and associated piping and other components.

The SIS is described in two phases; the Injection Phase and the Recirculation Phase. The Injection Phase provides emergency core cooling and additional negative reactivity immediately following actuation. The Recirculation Phase provides long-term post-accident cooling by recirculating water from the Containment sump.

Injection Phase

The principal components used during the injection phase are accumulators, the charging/high head Safety Injection (HHSI) pumps and the low head Safety Injection (LHSI) pumps.

The accumulators are passive components consisting of tanks containing borated water with nitrogen gas overpressure. Each accumulator is connected to an RCS cold leg through check valves. During plant operation the pressure in the RCS is much higher than the pressure in the accumulators, so the check valves remain closed. During an accident, the check valves open and the water in the accumulators is forced into the RCS, assuring rapid core flooding for large breaks.

The charging/HHSI pumps perform charging functions during normal plant operations. The safety injection function of these pumps is described here, but the pumps are evaluated for license renewal with the Chemical and Volume Control System. On a Safety Injection signal, these pumps provide high pressure injection and add negative reactivity to the core. The suction of the HHSI pumps is diverted from the volume control tank to the refueling water storage tank (RWST) by the Safety Injection signal.

The LHSI pumps provide a high volume of water at low pressures. For large breaks, the RCS is depressurized and voided of coolant rapidly. In this situation, the LHSI pumps and the accumulators provide the high flow rate that is required to quickly recover the exposed fuel and limit possible core damage.

Recirculation Phase

Unit 1: When the transfer to recirculation signal is generated, the LHSI pump suction valves from the Containment sump open. The suction of the charging/HHSI pumps is automatically shifted from the RWST to the discharge header of the LHSI pumps. The suctions of the LHSI pumps and charging/HHSI pumps from the RWST close. This alignment recirculates water from the Containment sump back to the RCS. If the LHSI pumps fail during recirculation, the outside recirculation spray pumps can supply suction to the charging/HHSI pumps by manual valve alignment.

Unit 2: Upon transfer to recirculation mode, the Containment sump water is recycled back to the RCS by the recirculation spray pumps, discharging through the LHSI headers to the HHSI pumps. The HHSI pumps then pump water to the loops.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides isolation against potential radioactive leakage into the RWST;
- Forms part of the RCS pressure boundary;

- Provides means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97;
- Provides passive injection of borated water into RCS upon RCS depressurization below the Safety Injection accumulator tank pressure;
- Provides protection against over-pressurization and rupture of Emergency Core Cooling System low pressure piping;
- Provides Containment isolation function;
- Provides source of emergency core cooling in response to a loss of coolant accident;
- Supports bleed and feed cooling if no other source of secondary heat sink is available;
- Isolates boron injection recirculation on a Safety Injection signal (Unit 1 only); and,
- Provides supply of gaseous nitrogen and instrument air to support RCS pressure relief, and feed and bleed functions (Unit 1 only).

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related areas prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ;
- Provides a normal and alternate flow path from the RWST to the charging pumps (FP) (Unit 1 only);
- Provides an injection path via the HHSI piping (FP) (Unit 1 only);
- Isolates the Safety Injection accumulators to allow RCS depressurization without accumulator injection into the RCS (FP) (Unit 1 only);
- Provides redundant HHSI flow paths from the RWST for RCS inventory control (FP) (Unit 2 only); and,
- Isolates or vents the Safety Injection accumulators to allow RCS depressurization without accumulator injection into the RCS (FP) (Unit 2 only).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 6.3	Section 6.3

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-06-2	LR 2-07-1A
LR 1-07-1	**LR 2-11-1**
LR 1-11-1	**LR 2-11-2**
LR 1-11-2	LR 2-13-2
LR 1-13-1	LR 2-14A-1
LR 1-34-6	--

Components Subject to Aging Management Review

Table 2.3.2-3 lists the component types that require aging management review and their intended functions.

Table 3.2.2-3, *Engineered Safety Features Systems – Safety Injection System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.2-3
Safety Injection System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Flexible Hose	Leakage boundary (spatial) Pressure boundary
Heat Exchanger	Heat Transfer Pressure Boundary
Orifice	Flow restriction Leakage boundary (spatial) Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Pump Casing	Leakage boundary (spatial) Pressure boundary
Tank	Leakage boundary (spatial) Pressure boundary
Tubing	Leakage boundary (spatial) Pressure boundary
Valve Body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

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2.3.3 AUXILIARY SYSTEMS

The following systems are included in this section:

- Area Ventilation Systems—Control Areas (Section 2.3.3.1)
- Area Ventilation Systems—Plant Areas (Section 2.3.3.2)
- Boron Recovery and Primary Grade Water System (Section 2.3.3.3)
- Building and Yard Drains System (Section 2.3.3.4)
- Chemical and Volume Control System (Section 2.3.3.5)
- Chilled Water System (Section 2.3.3.6)
- Compressed Air System (Section 2.3.3.7)
- Containment System (Section 2.3.3.8)
- Containment Vacuum and Leak Monitoring System (Section 2.3.3.9)
- Domestic Water System (Section 2.3.3.10)
- Emergency Diesel Generators and Air Intake and Exhaust System (Section 2.3.3.11)
- Emergency Diesel Generators—Air Start System (Section 2.3.3.12)
- Emergency Diesel Generators—Crankcase Vacuum System (Section 2.3.3.13)
- Emergency Diesel Generators—Fuel Oil System (Section 2.3.3.14)
- Emergency Diesel Generators—Lube Oil System (Section 2.3.3.15)
- Emergency Diesel Generators—Water Cooling System (Section 2.3.3.16)
- Emergency Response Facility Substation System (Common) (Section 2.3.3.17)
- Fire Protection System (Section 2.3.3.18)
- Fuel Pool Cooling and Purification System (Section 2.3.3.19)
- Gaseous Waste Disposal System (Section 2.3.3.20)
- Liquid Waste Disposal System (Section 2.3.3.21)
- Post-Accident Sample System (Section 2.3.3.22)
- Post-Design Basis Accident Hydrogen Control System (Section 2.3.3.23)
- Primary Component and Neutron Shield Tank Cooling Water System (Section 2.3.3.24)
- Radiation Monitoring System (Section 2.3.3.25)
- Reactor Plant Sample System (Section 2.3.3.26)
- Reactor Plant Vents and Drains System (Section 2.3.3.27)
- River Water System (Unit 1 only) (Section 2.3.3.28)
- Security Diesel Generator System (Common) (Section 2.3.3.29)
- Service Water System (Unit 2 only) (Section 2.3.3.30)

- Solid Waste Disposal System (Section 2.3.3.31)
- Supplementary Leak Collection and Release System (Section 2.3.3.32)

2.3.3.1 Area Ventilation Systems—Control Areas

System Description

The purpose of the Control Area Ventilation System is to provide cooling, heating, ventilation, humidity control, filtration, pressurization, and smoke removal for the main control room area (common to Unit 1 and Unit 2) and other Control Building areas (Unit 2 only).

Although the control boards are functionally and physically separate, Unit 1 and Unit 2 share a common control room. The control room areas of both units are open to each other and are, therefore, within the same pressure boundary. The emergency control room pressurization systems used during accidents are shared by both units. Each unit has separate cooling and pressurization subsystems.

The Control Area Ventilation System includes two separate control room cooling and ventilation systems at each unit consisting of redundant air handling units, refrigeration condensing units, River Water (Unit 1 only) or Service Water (Unit 2 only) cooling coils, temperature control air compressors and controls (Unit 1 only), fans, and associated ductwork and dampers.

In the event of an accident, the control room is pressurized with filtered air from the Control Room Emergency Ventilation System (CREVS) pressurization system fans while the normal ventilation systems continue to operate in the 100% recirculation mode. Three CREVS subsystems serve the common control room. Any one of the three CREVS subsystems is capable of pressurizing the entire control room. Two CREVS subsystems are powered from train A and train B of Unit 2, respectively. The third CREVS subsystem is powered from either train A or train B of Unit 1.

The two CREVS subsystems powered from Unit 2 are fully automatic. Either of these CREVS subsystems can pressurize the control room with no operator actions. The CREVS subsystem powered from Unit 1 is not fully automatic. Its fan control switches are not maintained in the auto start position, and manual damper alignment is required. The Unit 1 subsystem is not credited by Unit 2.

Unit 2 has a separate Control Building air-conditioning subsystem that ventilates the remainder of the Control Building external to the control room. The intake and exhaust fans and cooling coils for this subsystem are located in the equipment room of the Auxiliary Building.

Self-contained breathing apparatus units and sufficient reserve air cylinders are available to support the minimum control room shift composition for at least five hours. Air cylinders brought from off-site locations may be used to extend capacity beyond five hours.

At Unit 2, miscellaneous backdraft dampers provide protection against over-pressurization following a carbon dioxide actuation from the Fire Protection System.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides a means for adjusting the air flow to each zone in the control area;
- Provides the means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97;
- Provides essential support in the distribution of air from the emergency outdoor air pressurization fans and filters;
- Supplies filtered air to indefinitely maintain the pressurized condition in the main control area (when initiated due to a Containment isolation Phase B signal or high radiation level);
- Supplies control air to the Control Area Ventilation System (Unit 1 only);
- Supplies accumulators for inflation of bladders on the outside air isolation dampers (Unit 1 only);
- Provides for control room cooling under DBA conditions (Unit 1 only);
- Provides protection against CO_2 over-pressurization (Unit 2 only); and,
- Ensures sufficient ventilation and heat removal capability for the entire Control Building (Unit 2 only).

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs (Unit 2 only).

10 CFR 54.4(a)(3):

- Provides a zonal barrier against the spread of fires (FP);
- Provides capability to detect and remove smoke and supply fresh air to areas served by the control room HVAC system (FP);
- Provides portable ventilation or smoke removal for the control room (FP);
- Supports the loss of the control room ventilation - normal post-fire (FP);
- Provides for the manual isolation of fire affected control room zones while permitting the remaining zones to continue to function (FP) (Unit 1 only);
- Provides conditioned air to the main control room, computer room and control room ventilation equipment room areas to maintain control room habitability during shutdown following a fire (FP) (Unit 2 only);

- Provides isolation boundary to maintain CO_2 and halon concentration (FP) (Unit 2 only);
- Provides forced air heat removal from the control room complex via the control room supply and exhaust fans (SBO); and,
- Provides conditioned air to the control room complex (SBO) (Unit 1 only).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 9.13.4	Section 9.4.1

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-30-2	LR 2-29-2
LR 1-44A-1	LR 2-30-2
LR 1-44A-2	LR 2-33-1B
LR 1-44A-4	LR 2-33-2A
--	LR 2-33-3
--	**LR 2-44A-1**
--	**LR 2-44A-2**
--	**LR 2-44A-3**

Components Subject to Aging Management Review

Table 2.3.3-1 lists the component types that require aging management review and their intended functions.

Table 3.3.2-1, *Auxiliary Systems – Area Ventilation System—Control Area – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-1
Area Ventilation Systems—Control Areas
Components Subject to Aging Management Review

Component Type	Intended Function
Air dryer	Pressure boundary
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Damper housing	Pressure boundary
Duct	Pressure boundary
Fan housing	Pressure boundary Structural integrity (attached)
Filter housing	Pressure boundary
Flexible connection	Pressure boundary
Heat exchanger	Heat transfer Leakage boundary (spatial) Pressure boundary
Heater housing	Pressure boundary
Isokinetic nozzle	Pressure boundary
Moisture separator	Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Tank	Leakage boundary (spatial) Pressure boundary
Tubing	Pressure boundary
Valve body	Leakage boundary (spatial) Pressure boundary

2.3.3.2 Area Ventilation Systems—Plant Areas

Area Ventilation Systems consist of the following:

- Cooling (System Number 44B);
- Reactor Containment Building (System Number 44C);
- Auxiliary Building (System Number 44D) (Unit 2 only);
- Air Conditioning (System Number 44E) (Unit 1 only); and,
- Miscellaneous (System Number 44F).

System Description

The purpose of the Area Ventilation Systems is to provide ventilation and to control temperatures for plant areas other than the Control Room. Portions of some of these systems are safety-related. The systems consist primarily of air conditioning units, ducts, fans, filters, heat exchangers, piping, valves, dampers and associated controls and instrumentation. Various systems provide ventilation for areas or components as described below.

Cooling

The areas serviced by this system are typically provided with an air handling unit which recirculates air to maintain the design condition temperature. The air handling unit is equipped with cooling coils (and heating coils in some applications) that condition the air drawn through the unit. Chilled water (and hot water, where applicable) systems supply the unit coils at Unit 1. Unit 2 systems use Chilled Water or Service Water as a cooling medium, with some units also provided with hot water heating coils. Some Unit 2 areas include condenser-type air conditioning units. The Area Ventilation Systems—Cooling subsystems cool the following areas:

- Unit 1 Main Steam Valve Area;
- Unit 1 Safeguards Area;
- Unit 1 Cable Vault Area;
- Unit 1 Pipe Tunnel Area;
- Unit 1 Fuel Building;
- Unit 2 Main Steam Valve Area;
- Unit 2 North Safeguards Area;
- Unit 2 South Safeguards Area;
- Unit 2 Cable Vault and Rod Control Area;
- Unit 2 Pipe Tunnel Area;
- Unit 2 Fuel Building;
- Unit 2 Decontamination Building;

- Unit 2 Motor Control Centers; and,
- Unit 2 Alternate Shutdown Panel.

Reactor Containment Building

Containment Air Recirculation Cooling – Bulk air cooling of the Containment is achieved by air recirculation cooling systems with the recirculated air normally being cooled by chilled water. Unit 1 can use River Water as a backup cooling medium, and Unit 2 can use Service Water as a backup cooling medium. Cooled air is discharged into common ductwork supplying the ventilated spaces. Air leaving the ventilated spaces is recirculated back to the supply fans via the annular space between the crane wall and Containment outside wall.

Containment Iodine Filtration (called the Containment Atmosphere Filtration at Unit 2) – The filtration system within the Containment is used at the discretion of the plant operator. The system is not credited for any safety-related function or regulated event.

Containment Purge Exhaust and Supply – During shutdown periods, Containment purging ventilation is provided by an exhaust system and supply system. This system also functions as a heating and ventilation system during periods of maintenance. The purge system exhaust duct is lined up to the Supplementary Leak Collection and Release System. Ductwork associated with this function is evaluated in that system. Containment purge includes safety-related Containment penetrations (Unit 2 only), but otherwise is not credited for any safety-related function or regulated event.

Control Rod Drive Mechanism Shroud Cooling – Cooling of the control rod drive mechanism shroud is provided by drawing Containment ambient air through the shroud and ductwork to fans. The fans discharge through component cooling water coil banks before returning the air to Containment ambient. Shroud cooling is not credited for any safety-related function or regulated event.

Auxiliary Building (Unit 2 only)

The Unit 1 Auxiliary Building Ventilation System is not credited for any safety-related function or regulated event. The Supplementary Leak Collection and Release system performs the credited ventilation functions for the Unit 1 Auxiliary Building.

Unit 2 Auxiliary Building air handling units include preheat coils using hot water as the heating medium, cooling coils using chilled water as the cooling medium, reheat coils using hot water as the heating medium, and motor-driven fans. Air is supplied to all levels through ductwork. The system is designed on a once-through basis, with the exception that some air is recirculated from the Auxiliary Building equipment room. The Emergency Exhaust Fan System, consisting of two axial flow exhaust fans, ductwork, and dampers, provides ventilation for the charging pump cubicles and component cooling water pumps general area in the event of a failure of normal ventilation.

The two filter exhaust fans of the Supplementary Leak Collection and Release System are used to exhaust the air. Air is exhausted at a rate higher than the supply to maintain the buildings under a negative pressure.

Air Conditioning (Unit 1 only)

Switchgear Ventilation – Air exhausted from switchgear areas by the switchgear exhaust fan is ducted through an air filter, then a bank of six chilled water cooling coils. The conditioned air is then ducted to the suction side of the switchgear supply fan, where it is distributed to switchgear, rod control room, cable tray mezzanine, and the battery rooms. The cooling coils are cooled by a closed Chilled Water System. The chilled water is circulated by chilled water pumps to the switchgear ventilation system chillers. Cooling water for the chillers is supplied by the River Water System.

Various shops and office areas – Air handling units supply a mixture of outdoor and recirculated conditioned air. Return air fans exhaust air from the areas. A portion of the exhaust goes to the atmosphere and a portion is returned to the air handling units.

Miscellaneous

Most areas are ventilated by roof, wall or ducted fans that provide supply, exhaust, or some combination of these flows. Descriptions for some specific areas are provided below, for selected areas that have unique system features.

Unit 1 Service Building – In addition to the Switchgear Cooling System, heated air in emergency switchgear is removed by one of two redundant continuously running emergency switchgear and battery room exhaust fans. In the event of a loss of offsite power and loss of normal switchgear supply fan, one of two redundant emergency switchgear and battery room supply fans is started. The fan will supply outside air for heat removal from the emergency switchgear and battery rooms. These fans are safety-related.

Unit 2 Emergency Switchgear Area – The emergency switchgear area is provided with two supply and two exhaust fans to remove heat. Both Train A fans operate together, and both Train B fans operate together. Either pair of fans will handle all ventilation requirements, regulating temperature by modulating outdoor air, return air, and exhaust air dampers. These fans are safety-related.

Intake Structure – Each pump cubicle is supplied by a Unit 1 fan. An additional fan is provided in the cubicle containing the motor-driven fire pump. Each cubicle containing a Unit 2 service water pump is also provided with a Unit 2 fan. These fans supply a mixture of outdoor air and recirculated air to the cubicles. Outdoor air supplied to the four cubicles is exhausted by way of vents in the upper section of the cubicle to the building interior and in turn to the atmosphere through exhaust roof hoods.

Unit 1 Diesel Generator Building – Each of the two diesel generator rooms contains a ceiling-mounted propeller exhaust fan, which discharges room air outdoors to dissipate excess equipment heat. Operation of either fan automatically opens its respective discharge damper, and opens the outdoor air intake double damper in that particular diesel generator room. Starting of either diesel generator engine will also cause its respective outdoor air intake double damper to open regardless of exhaust fan operation. At Unit 1, this outdoor air intake double damper provides combustion air into the room, and the diesel draws combustion air from the room. The Unit 2 diesels, however, draw combustion air directly from outside.

System Intended Functions

Area Ventilation Systems – Cooling (System 44B)

10 CFR 54.4(a)(1):

- Provides for the automatic termination of air flow in the Safeguards Area cooling subsystem upon receiving a Containment isolation Phase B signal (Unit 1 only);
- Provides the standby function for heat removal from the Alternate Shutdown Panel Room (Unit 2 only); and,
- Provides heat removal from areas containing safety-related equipment (Unit 2 only).

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs (Unit 2 only); and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs (Unit 2 only).

10 CFR 54.4(a)(3):

- Prevents the spread of fire through ductwork (FP);
- Provides fan shutdown and automatic closure of ventilation dampers and doors for the east and west Cable Vaults served by total flooding gas extinguishing system (FP) (Unit 1 only);
- Provides isolation boundary to maintain CO_2 concentration (FP) (Unit 2 only);
- Provides smoke venting of the Cable Vault and rod control areas, alternate shutdown panel room, and other safety-related areas (FP) (Unit 2 only);
- Provides ventilation for the Cable Vault, rod control areas and alternate shutdown panel room (FP) (Unit 2 only); and,

- Contains components relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ (Unit 2 only).

Area Ventilation Systems – Reactor Containment Building (System 44C)

10 CFR 54.4(a)(1):

- Circulates and distributes cooled air to the ventilated spaces of the Containment (Unit 1 only);
- Provides the means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97 (Unit 2 only);
- Provides the means to maintain the bulk air temperature in Containment suitable for personnel and equipment operation during normal operation and a loss of offsite power (Unit 2 only); and,
- Provides a Containment purge isolation function (Unit 2 only).

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs (Unit 2 only).

10 CFR 54.4(a)(3):

- Enables the Emergency Diesel Generator loading by removing from service the Containment air recirculation units (SBO);
- Prevents the spread of fire through ductwork (FP) (Unit 2 only);
- Provides for removal of smoke and gas following a fire (FP) (Unit 2 only);
- Provides the means to maintain the bulk air temperature in Containment suitable for personnel and equipment operation during normal operation and a loss of offsite power (FP) (Unit 2 only); and,
- Contains components relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ (Unit 2 only).

Area Ventilation Systems – Auxiliary Building (Unit 2 only) (System 44D)

10 CFR 54.4(a)(1):

- Provides the means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97;
- Performs an isolation function upon receipt of a Containment isolation Phase A signal; and,
- Evacuates the component cooling and charging pump areas and the Post-Accident Sampling System room.

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Prevents the spread of fire through ductwork (FP);
- Provides for removal of smoke and gas following a fire (FP);
- Provides ventilation for safety-related areas including the charging pump cubicles and primary component cooling water pumps (FP); and,
- Contains components relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ.

Area Ventilation Systems – Air Conditioning (Unit 1 only) (System 44E)

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2):

- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Prevents the spread of fire through ductwork (FP);
- Provides fan shutdown and automatic closure of ventilation dampers and doors for the cable tray mezzanine served by total flooding gas extinguishing system (FP); and,

- Provides smoke and/or carbon dioxide venting of the cable spreading room, the normal switchgear area, and the motor generator room (FP).

Area Ventilation Systems – Miscellaneous (System 44F)

10 CFR 54.4(a)(1):

- Supplies outdoor air to the Diesel Generator Building cubicles and discharges room air outdoors to dissipate excess equipment heat;
- Supplies a mixture of outdoor air and recirculated air to the River Water (Unit 1 only) or Service Water (Unit 2 only) pump cubicles to dissipate excess equipment heat;
- Supplies a temperature-controlled mixture of outdoor air and exhaust air to dissipate excess equipment heat; and,
- Removes heat and maintains proper ventilation to preclude the buildup of hydrogen in the battery rooms.

10 CFR 54.4(a)(2):

- Remove excess heat from the Auxiliary Intake Structure.

10 CFR 54.4(a)(3):

Unit 1 only:

- Provides for shutdown of exhaust fan, closure of intake and exhaust dampers and closure of doors upon carbon dioxide suppression system actuation for the diesel generator cubicles (FP);
- Provides manual smoke venting of the two EDG cubicles (FP);
- Provides smoke and/or carbon dioxide venting of the emergency switchgear areas (FP);
- Satisfies safe shutdown requirements for ventilation to the emergency switchgear and battery rooms and to the EDG rooms via portable ventilation - alternate system (FP);
- Prevents the spread of fire through ductwork (FP);
- Supplies combustion air for the EDGs and discharges room air outdoors to dissipate excess equipment heat (FP and SBO);
- Removes heat and maintains proper ventilation to preclude the buildup of hydrogen in the battery rooms (FP and SBO);
- Provides forced air heat removal from the Service Building emergency switchgear rooms (SBO); and,

- Removes heat from Intake Structure cubicles to support river water pump operation (SBO).

Unit 2 only:

- Prevents the spread of fire/smoke through ductwork (FP);
- Provides isolation boundary in Diesel Generator Building cubicles to maintain carbon dioxide concentration (FP);
- Provides smoke and/or carbon dioxide venting of various areas containing safety-related and safe-shutdown equipment (FP);
- Provides ventilation and the removal of dissipated heat loads from the emergency switchgear rooms and battery rooms (FP);
- Provides ventilation of Intake Structure cubicles (FP);
- Supplies combustion air for the EDGs and discharges room air outdoors to dissipate excess equipment heat (FP);
- EDG cubicle ventilation prevents the buildup of combustible fumes and dissipates excess equipment heat (SBO);
- Provides ventilation of Intake Structure pump cubicles under Unit 1 SBO conditions (SBO); and,
- Removes heat and maintains proper ventilation to preclude the buildup of hydrogen in the battery rooms (SBO).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 9.13.2 9.13.5 9.13.6	Sections 9.4.3 9.4.6 9.4.7 9.4.8 9.4.9 9.4.10 9.4.11 9.4.12

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-16-1	LR 2-12-1
LR 1-29-2	LR 2-15-4
LR 1-33-3	LR 2-29-2
LR 1-44B-1	LR 2-29-3
LR 1-44E-1	LR 2-29-4
LR 1-44E-3	LR 2-30-2
LR 1-44F-1	LR 2-30-3
LR 2-44F-1	LR 2-33-2A
--	LR 2-41A-3
--	LR 2-41A-4
--	**LR 2-44B-1**
--	**LR 2-44B-2**
--	**LR 2-44B-3**
--	**LR 2-44C-1**
--	**LR 2-44C-2**
--	**LR 2-44D-1**
--	**LR 2-44D-2**
--	**LR 2-44D-3**
--	**LR 2-44F-1**
--	**LR 2-44F-3**
--	**LR 2-44F-4**
--	**LR 2-44F-5**

Components Subject to Aging Management Review

Table 2.3.3-2 lists the component types that require aging management review and their intended functions.

Table 3.3.2-2, *Auxiliary Systems – Area Ventilation System—Plant Areas – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-2
Area Ventilation Systems—Plant Areas
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Damper housing	Pressure boundary Structural integrity (attached)
Drip pan	Leakage boundary (spatial)
Duct	Pressure boundary Structural integrity (attached)
Fan housing	Pressure boundary
Filter housing	Pressure boundary
Flexible connection	Pressure boundary
Flexible hose	Pressure boundary
Heat exchanger (channel, plenum, shell, tube)	Heat transfer Leakage boundary (spatial) Pressure boundary
Isokinetic nozzle	Pressure boundary
Orifice	Flow restriction Pressure boundary Structural integrity (attached)
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Piping (used as duct)	Pressure boundary
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.3.3 Boron Recovery and Primary Grade Water System

System Description

The purpose of the Boron Recovery and Primary Grade Water System is to provide makeup water to the Reactor Coolant System and to process reactor coolant letdown and liquid collected in the primary drains transfer tanks. The system is primarily nonsafety-related, and consists of pumps, tanks, heat exchangers, degasifiers, evaporators, and the required piping, valves and controls to operate the system.

Degasifiers are used to reduce the concentration of dissolved and entrained gases in the primary coolant. This recovered gas is then discharged to the Gaseous Waste System for processing.

Degasified liquid may be evaporated to extract the boric acid water and collect the condensed primary grade water for re-use. The primary grade water is stored in two tanks at Unit 1; these tanks supply both units for various uses in the reactor plant.

System Intended Functions

10 CFR 54.4(a)(1):

- Serves as a pressure boundary for containing the RCS letdown flow from the Chemical and Volume Control System (Unit 2 only).

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support to safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ (Unit 2 only).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 9.2	Sections 9.2.8 9.3.4.6

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-08-1	**LR 2-08-1**
LR 1-08-2	**LR 2-08-2**
LR 1-08-3	**LR 2-08-3**
LR 1-08-4	LR 2-15-1
LR 1-08-5	LR 2-15-6
LR 1-08-6	LR 2-17-1
LR 1-08-7	LR 2-18-1
LR 1-15-2	LR 2-20-1
LR 1-18-3	LR 2-27A-1
LR 1-27-2	--

Components Subject to Aging Management Review

Table 2.3.3-3 lists the component types that require aging management review and their intended functions.

Table 3.3.2-3, *Auxiliary Systems – Boron Recovery and Primary Grade Water System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-3
Boron Recovery and Primary Grade Water System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary (Unit 2 only) Structural integrity (attached)
Expansion joint (Unit 1 only)	Leakage boundary (spatial)
Filter housing	Leakage boundary (spatial)
Flexible hose	Leakage boundary (spatial) Pressure boundary (Unit 2 only)
Heat exchanger (shell and channel)	Leakage boundary (spatial) Pressure boundary (Unit 2 only)
Heat exchanger (tube / tubesheet) (Unit 2 only)	Pressure boundary
Orifice	Flow restriction (Unit 2 only) Leakage boundary (spatial) Pressure boundary (Unit 2 only)
Piping	Leakage boundary (spatial) Pressure boundary (Unit 2 only) Structural integrity (attached)
Pump casing	Leakage boundary (spatial)
Sight glass (Unit 1 only)	Leakage boundary (spatial)
Strainer body	Leakage boundary (spatial)
Tank	Leakage boundary (spatial)
Tubing	Leakage boundary (spatial) Pressure boundary (Unit 2 only)
Valve body	Leakage boundary (spatial) Pressure boundary (Unit 2 only) Structural integrity (attached)

2.3.3.4 Building and Yard Drains System

System Description

The Building and Yard Drains System is a nonsafety-related system that provides drainage for normal non-radioactive leakage, leakage due to maintenance, precipitation, and sanitary drains. The system is not credited for any safety-related function or regulated event.

The Building and Yard Drains System is divided into four similar subsystems at Unit 1 and Unit 2:

- Floor Drains System, which collects and disposes of internal drainage from buildings;
- Oily Drains System, which collects drainage that may include equipment oil leakage. This subsystem includes oil separators that remove oil from the drainage prior to discharge of the waste water;
- Sanitary Drains System, which handles sewage from plumbing fixtures. The system directs drainage to the sewage treatment systems; and
- Roof and Yard Drains System, which directs drainage to the storm sewers.

Additionally, Unit 2 has a fifth subsystem, the Recirculation Spray Pump Casing Drains System. The drains in the Recirculation Spray Pump Casing Drains System have the potential to be radioactively contaminated. This subsystem is evaluated in the Reactor Plant Vents and Drains System (Section 2.3.3.27).

System Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2):

- The integrity of nonsafety-related, fluid-retaining components in safety-related areas prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Prevents the spread of fire through the drain system (FP) (Unit 1 only).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 9.7.2	Section 9.2.4

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-41D-1	**LR 2-41D-2**
LR 1-41D-2	**LR 2-41D-4**
LR 1-43-3	--

Components Subject to Aging Management Review

Table 2.3.3-4 lists the component types that require aging management review and their intended functions.

Table 3.3.2-4, *Auxiliary Systems – Building and Yard Drains System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-4
Building and Yard Drains System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial)
Expansion joint	Leakage boundary (spatial)
Flow controller	Leakage boundary (spatial)
Oil interceptor	Leakage boundary (spatial)
Piping	Leakage boundary (spatial) Pressure boundary
Pump casing	Leakage boundary (spatial)
Sight glass	Leakage boundary (spatial)
Tank	Leakage boundary (spatial)
Valve body	Leakage boundary (spatial)

2.3.3.5 Chemical and Volume Control System

System Description

The Chemical and Volume Control System is a safety-related system, and is the primary support system for the RCS during all normal modes of plant operation. Charging and letdown flows maintain a programmed water level in the RCS pressurizer.

Reactor coolant is letdown to the Chemical and Volume Control System from the RCS cold leg. Letdown temperature is reduced by the regenerative heat exchanger. The letdown pressure is then reduced by restricting orifices. The letdown is further cooled by the non-regenerative heat exchanger. Downstream of the non-regenerative heat exchanger, a second pressure reduction occurs.

The letdown flow path then leads to demineralizers, a filter, and into the volume control tank. The charging pumps normally take suction from the volume control tank and return the purified reactor coolant to the RCS cold leg via the charging system.

The bulk of the charging flow is returned to the RCS through the regenerative heat exchanger, where its temperature is increased. A parallel charging flowpath with a control valve is also provided from the regenerative heat exchanger outlet to the pressurizer spray line. This provides auxiliary spray to the vapor space of the pressurizer.

A portion of the charging flow is directed to the reactor coolant pump seals via a seal water injection filter. High-pressure injection water is introduced to the reactor coolant pumps through a connection on the thermal barrier flange. Both the radial bearing and the seals are lubricated by the injection water.

The system also provides boric acid storage for reactivity control and makeup.

Additionally, the centrifugal charging pumps serve as the HHSI pumps in the Emergency Core Cooling System.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides a Containment isolation function;
- Forms part of the RCS pressure boundary;
- Provides the means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97;
- Supplies high head injection flow through established flow paths to the Safety Injection System;

- Provides auxiliary spray to pressurizer vapor space for depressurization of the RCS and cooldown of the plant;
- Stores and is capable of supplying an amount of boric acid which always exceeds that required to borate the RCS to a cold shutdown concentration, assuming the rod cluster control assembly with the highest reactivity worth is stuck in its fully withdrawn position;
- Provides isolation against the potential for radioactive leakage into the RWST during and following a postulated design basis accident; and,
- Provides a continuous supply of filtered, borated water for reactor coolant pump seal injection and leak-off under normal, accident and post-fire conditions.

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ;
- Provides a continuous supply of filtered, borated water for reactor coolant pump seal injection and leak-off under normal, accident and post-fire conditions (FP);
- Provides reactor makeup/reactivity control and is capable of borating the RCS to cold shutdown (i.e., maintains a safe shutdown margin) by providing a boric acid solution through one of several flow paths, and from either one of two sources of boric acid (FP or SBO); and,
- Minimizes the loss of reactor coolant inventory (SBO).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR Section	BVPS Unit 2 UFSAR Section
Sections 6.3.2 9.1	Sections 6.3.2 9.3.4

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-06-3	**LR 2-07-1A**
LR 1-07-1	**LR 2-07-1B**
LR 1-07-2	**LR 2-07-2**
LR 1-07-3	**LR 2-07-3**
LR 1-07-4	**LR 2-07-5**
LR 1-07-5	LR 2-08-1
LR 1-08-1	LR 2-14A-2
LR 1-08-6	LR 2-14C-1
LR 1-14A-2	LR 2-15-2
LR 1-15-2	LR 2-15-5
LR 1-15-4	LR 2-18-1
LR 1-18-3	LR 2-30-2
LR 1-19-1	--
LR 1-27-2	--
LR 1-30-2	--

Components Subject to Aging Management Review

Table 2.3.3-5 lists the component types that require aging management review and their intended functions.

Table 3.3.2-5, *Auxiliary Systems – Chemical and Volume Control System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-5
Chemical and Volume Control System
Components Subject to Aging Management Review

Component Type	Intended Function
Blender body	Pressure boundary
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Demineralizer	Leakage boundary (spatial) Pressure boundary
Filter housing	Pressure boundary
Flexible hose	Leakage boundary (spatial) Pressure boundary
Gear box	Pressure boundary
Heat exchanger	Heat transfer Leakage boundary (spatial) Pressure boundary
Orifice	Flow restriction Leakage boundary (spatial) Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Pump casing	Leakage boundary (spatial) Pressure boundary
Sight glass	Leakage boundary (spatial) Pressure boundary
Sparger body	Pressure boundary
Strainer body	Leakage boundary (spatial) Pressure boundary
Tank	Leakage boundary (spatial) Pressure boundary

Table 2.3.3-5
Chemical and Volume Control System
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Tubing	Leakage boundary (spatial) Pressure boundary
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.3.6 Chilled Water System

System Description

The Chilled Water System includes safety-related Containment penetration piping and instrumentation, but is otherwise a nonsafety-related Auxiliary System designed to provide cooling to various plant components.

The Chilled Water System consists of three chillers at each unit. River Water (Unit 1 only) or Service Water (Unit 2 only) is supplied to the condensers via booster pumps. Chilled water is circulated through the chillers and the various cooling loads by chilled water circulation pumps. Each chiller has its own circulation pump. The system is designed to deliver water at 45°F to various station process and ventilation loads.

In the event the Chilled Water System is unavailable, River Water (Unit 1 only) or Service Water (Unit 2 only) can be supplied as backup cooling water to the Containment air recirculation cooling coils.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides the means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97; and,
- Provides a Containment isolation function.

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 9.4.1.2 9.4.3.2	Section 9.2.2.2

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-13-1	LR 2-13-2
LR 1-19-1	LR 2-19-1
LR 1-19-2	LR 2-19-2
LR 1-29-1	**LR 2-29-2**
LR 1-29-2	**LR 2-29-3**
--	**LR 2-29-4**
--	LR 2-44A-1
--	LR 2-44B-1
--	LR 2-44B-2
--	LR 2-44B-3
--	LR 2-44C-1

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
--	LR 2-44D-1
--	LR 2-44D-2
--	LR 2-44D-3

Components Subject to Aging Management Review

Table 2.3.3-6 lists the component types that require aging management review and their intended functions.

Table 3.3.2-6, *Auxiliary Systems – Chilled Water System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-6
Chilled Water System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural Integrity (attached)
Heat exchanger	Leakage boundary (spatial)
Orifice	Leakage boundary (spatial)
Piping	Leakage boundary (spatial) Pressure boundary Structural Integrity (attached)
Pump casing	Leakage boundary (spatial)
Sight Glass	Leakage boundary (spatial)
Strainer body	Leakage boundary (spatial)
Tank	Leakage boundary (spatial)
Tubing	Leakage boundary (spatial)
Valve body	Leakage boundary (spatial) Pressure boundary Structural Integrity (attached)

2.3.3.7 Compressed Air System

System Description

The Compressed Air System includes safety-related Containment penetration piping and instrumentation, and safety-related components in the Intake Structure to support inflating flood door seals, but is otherwise a nonsafety-related Auxiliary System designed to provide adequate compressed air capacity of suitable quality and pressure for normal station service and instrumentation.

The Compressed Air System is made up of several subsystems:

- Station Air System;
- Instrument Air System;
- Containment Instrument Air System;
- Condensate Polishing Air System (Unit 2 only); and,
- Intake Structure and Unit 1 Cooling Tower Pump House Air Systems.

The Station Air System is supplied by two air compressors. Two station air receiver tanks and the necessary pipes and valves deliver the air to numerous plant locations for maintenance personnel use. This system also supplies raw air to the instrument air system. Station Air can be supplied inside the Containment through a pipe penetration.

The Instrument Air System includes filters, air dryers, and a receiver tank. The system has the necessary pipes and valves to deliver this air to numerous air loads. This system also has bypass filters which can be used during system upsets or dryer maintenance. The function of this system is to provide clean, dry air to the station's air operated components. At Unit 1, this system is the normal supply to the Containment Instrument Air system. At Unit 2, the Instrument Air System provides a backup supply to the Containment Instrument Air System.

The Unit 1 Containment Instrument Air System is supplied by the Station Instrument Air System via an air-operated Containment isolation trip valve. The Unit 2 Containment Instrument Air System is normally supplied by rotary, water seal air compressors. A refrigerant type air dryer is supplied to dry the air. Two receiver tanks are installed in the system. One receiver tank is located outside of the Containment. An additional receiver is located inside the Containment. The function of this system is to provide clean, dry air to the air operated components in the Containment.

The Unit 2 Condensate Polishing Air System consists of an air compressor, a receiver tank, and the necessary pipes and valves. The Condensate Polishing air compressor is normally only used when there is heavy air demand in the Condensate Polishing System. The function of this system is to supply raw compressed air to the Condensate Polishing System and to provide a backup air supply to the Station Air System.

In the event of a loss of both station air compressors (and, at Unit 2, the condensate polishing air compressor), a diesel-driven air compressor is available to supply air to the instrument air lines to enable operation of critical air-operated valves and controllers.

The Intake Structure and the Unit 1 Cooling Tower Pump House each contain an independent compressed air system to supply the loads in the respective building. Additionally, the Intake Structure includes air tanks that have sufficient capacity to inflate and maintain flood door seals at the required pressure for the duration of the Probable Maximum Flood. These tanks are filled from compressed air or gas bottles, and do not rely upon the system compressors.

Operation of the Unit 2 Compressed Air System (i.e., supplying compressed air) is credited for operation of some air-operated valves associated with charging and letdown flowpaths, thermal barrier cooling, and RHR flow control during post-fire shutdown. The supply of compressed air is not credited for any other license renewal intended function at Unit 2. The supply of air from Unit 1 compressors is not credited for any intended function, although Unit 1 credits the storage of compressed air or gas in accumulator tanks for operation of inflatable flood door seals in the Intake Structure. Additionally, both units include Containment penetrations that provide a safety-related pressure boundary function.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides Containment isolation function;
- Provides means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97; and,
- Provides sufficient air capacity to inflate and maintain the Intake Structure pump cubicle flood door seals at the required pressure for the duration of the probable maximum flood.

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs (Unit 2 only).

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ;
- Ensures steam line isolation in the event of a 10 CFR 50 Appendix R design basis fire (FP) (Unit 1 only). (Note: This active function requires only a vent flowpath.

Piping integrity is not required, and no components are credited with performing this function. Since components have no license renewal intended function, no further evaluation is required.);

- Provides compressed air to position air-operated valves required for post-fire safe shutdown (FP) (Unit 2 only); and,
- Provides a Containment isolation function (SBO) (Unit 2 only).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 9.8	Section 9.3.1

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-34-1	LR 2-07-1A
LR 1-34-2	LR 2-15-2
LR 1-34-8	LR 2-15-3
--	**LR 2-34-1A**
--	**LR 2-34-1B**
--	**LR 2-34-2**
--	**LR 2-34-3**
--	**LR 2-34-10**
--	**LR 2-34-11**

Components Subject to Aging Management Review

Table 2.3.3-7 lists the component types that require aging management review and their intended functions.

Table 3.3.2-7, *Auxiliary Systems – Compressed Air System – Summary of Aging Management Evaluation,* provides the results of the aging management review.

Table 2.3.3-7
Compressed Air System
Components Subject to Aging Management Review

Component Type	Intended Function
Air dryer	Leakage boundary (spatial) Pressure boundary
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Chemical injector	Pressure boundary
Filter housing	Leakage boundary (spatial) Pressure boundary
Flexible hose	Pressure boundary
Heat exchanger	Heat transfer Leakage boundary (spatial) Pressure boundary
Moisture separator	Leakage boundary (spatial) Pressure boundary
Orifice	Flow restriction Leakage boundary (spatial) Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Pump casing	Pressure boundary
Sight glass	Leakage boundary (spatial)
Silencer	Pressure boundary
Strainer body	Leakage boundary (spatial)
Tank	Pressure boundary
Trap body	Leakage boundary (spatial)

**Table 2.3.3-7
Compressed Air System
Components Subject to Aging Management Review
(continued)**

Component Type	Intended Function
Tubing	Leakage boundary (spatial) Pressure boundary
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.3.8 Containment System

System Description

The Containment System supports the maintenance of the Containment pressure boundary. It contains the mechanical components that are associated with the personnel airlock and the equipment hatch emergency airlock. These mechanical components include piping, valves and instruments associated with the airlock pressure instrumentation, equalization, or testing. It also includes the actuators, pumps, tanks, piping components and valves associated with the airlock door hydraulic operating mechanisms. The system contains safety-related components. All other components associated with the Containment structure are evaluated as structural components in Section 2.4.22, Reactor Containment Building.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides pressure boundary or essentially leak tight barrier to protect public health and safety in the event of any postulated design basis events.

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3): None

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 5.2.4.8	Section 3.8.1.1.3.2

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-47-1	**LR 2-47-1**

Components Subject to Aging Management Review

Table 2.3.3-8 lists the component types that require aging management review and their intended functions.

Table 3.3.2-8, *Auxiliary Systems – Containment System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-8
Containment System
Components Subject to Aging Management Review

Component Type	Intended Function
Actuator housing	Leakage boundary (spatial)
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Flexible hose	Leakage boundary (spatial)
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

Table 2.3.3-8
Containment System
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Pump casing	Leakage boundary (spatial)
Sight glass	Leakage boundary (spatial)
Strainer body	Leakage boundary (spatial)
Tank	Leakage boundary (spatial)
Tubing	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.3.9 Containment Vacuum and Leak Monitoring System

System Description

The Containment Vacuum and Leakage Monitoring System produces and maintains subatmospheric pressure in the Containment during normal operation, and is used to determine the leakage rate into or out of Containment during normal operation and periodic tests. Portions of the Containment Vacuum and Leakage Monitoring System are safety-related.

The Containment Vacuum and Leakage Monitoring System consists of ejectors, vacuum pumps, piping, valves and instrumentation.

The Containment vacuum ejector uses Auxiliary Steam to remove air from the Containment structure to create a subatmospheric pressure prior to plant operation. Once the subatmospheric condition is achieved, it is maintained by the vacuum pumps.

The discharges of the Containment vacuum pumps are combined and pass through a flow indicator and integrator to the Gaseous Waste Disposal System. There is also a tap on the suction line of each pump, which connects to the Post-Design Basis Accident Hydrogen Control System.

The system also provides instrument piping for Containment pressure measurement, and provides the sample and return flowpath for the Containment air particulate and gaseous activity radiation monitor. The monitor is evaluated in the Radiation Monitoring System. The Containment vacuum pumps provide an alternate method of sampling the Containment air in the event the activity monitor pump is out of service.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides a Containment isolation function;
- Provides the means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97;
- Measures Containment total pressure and generates Safety Injection, Containment isolation Phase A (CIA), Containment isolation Phase B (CIB) and steam line isolation trip signals subsequent to appropriate setpoints being exceeded; and,
- Samples the Containment atmosphere for particulate and gaseous activity (Unit 2 only).

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- System contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 5.4.2	Sections 6.2.4.2 9.5.10

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-12-1	**LR 2-12-1**
LR 1-46-1	**LR 2-12-2**
--	LR 2-14C-2
--	LR 2-43-21

Components Subject to Aging Management Review

Table 2.3.3-9 lists the component types that require aging management review and their intended functions.

Table 3.3.2-9, *Auxiliary Systems – Containment Vacuum and Leak Monitoring System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-9
Containment Vacuum and Leak Monitoring System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Ejector	Leakage boundary (spatial) Structural integrity (attached)
Flexible hose	Leakage boundary (spatial) Pressure boundary
Heater body	Pressure boundary
Moisture separator	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

Table 2.3.3-9
Containment Vacuum and Leak Monitoring System
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Orifice	Flow restriction Leakage boundary (spatial) Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Pump casing	Leakage boundary (spatial) Structural integrity (attached)
Strainer body	Leakage boundary (spatial)
Trap body	Leakage boundary (spatial)
Tubing	Leakage boundary (spatial) Pressure boundary
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.3.10 Domestic Water System

System Description

The Domestic Water System is a nonsafety-related system that supplies softened water as required to various plant areas for sanitation, emergency showers, and eye wash stations. Domestic water is also used to fill drain traps and can be used as an alternate supply of cooling to the Unit 2 station air compressors. The system is not credited for any safety-related function or regulated event.

The system contains piping components, valves, pumps, water softener (not used), tanks and water heaters.

The Domestic Water System is currently supplied by the Midland Water System. Prior to the connection to the Midland supply, the site processed and stored all of the required domestic water without a supply from a municipal system.

The Midland system supply pressure is satisfactory for all site needs. Therefore, the portions of the system previously used to process, store, and pressurize domestic water are no longer in service and are isolated in the field. However, no Domestic Water System equipment or components were retired, and they are available for use if the need ever arises.

System Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2):

- The integrity of nonsafety-related, fluid-retaining components in safety-related areas prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3): None

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 9.11.2 9.11.3	Section 9.2.4

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-41C-1	**LR 2-41C-1**

Components Subject to Aging Management Review

Table 2.3.3-10 lists the component types that require aging management review and their intended functions.

Table 3.3.2-10, *Auxiliary Systems – Domestic Water System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-10
Domestic Water System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial)
Heat exchanger	Leakage boundary (spatial)
Level gage	Leakage boundary (spatial)
Piping	Leakage boundary (spatial)
Pump casing	Leakage boundary (spatial)
Strainer body	Leakage boundary (spatial)
Tank	Leakage boundary (spatial)
Valve body	Leakage boundary (spatial)
Water hammer arrestor	Leakage boundary (spatial)

2.3.3.11 Emergency Diesel Generators and Air Intake and Exhaust System

The Emergency Diesel Generator (EDG) System for each unit consists of two safety-related engine/generator sets, each of which is dedicated to an emergency train. Each engine/generator set includes all of the necessary controls and support equipment that is required to start, run, sequence and load the EDG in the emergency mode to meet the plant's operational requirements. Upon a loss of voltage to an emergency bus, the EDG will automatically start, energize the bus and then sequence on the emergency loads to the emergency bus. The EDG will carry the load, up to its full load rating, for up to seven days.

Each EDG also contains controls to allow the EDG to be synchronized to the station's power supply and operated at full load to demonstrate that the EDG is operational.

Each EDG includes mechanical support equipment that can be grouped into six subsystems, addressed as identified in the following Sections. Each subsystem includes safety-related subcomponents of the diesel generator.

1. Emergency Diesel Generators and Air Intake and Exhaust System (see System Description following this list)
2. Emergency Diesel Generators—Air Start System (Section 2.3.3.12)
3. Emergency Diesel Generators—Crankcase Vacuum System (Section 2.3.3.13)
4. Emergency Diesel Generators—Fuel Oil System (Section 2.3.3.14)
5. Emergency Diesel Generators—Lube Oil System (Section 2.3.3.15)
6. Emergency Diesel Generators—Water Cooling System (Section 2.3.3.16)

System Description

The Unit 1 diesels draw combustion air from within the Diesel Generator Building. Combustion air for the Unit 2 diesels is drawn from outside the Diesel Generator Building and is separated from the exhaust such that intake air will not be diluted or contaminated by exhaust products.

A turbocharger is used to provide the volume of air needed for combustion and scavenging. The air from the blower is raised to a higher pressure and likewise to a higher temperature. The air temperature is reduced by passing it through aftercoolers, making cooled air of greater density and therefore providing more oxygen to the engine.

The diesels have exhaust silencers, and exhaust at the building roof level in protected enclosures.

The synchronous generators of the Unit 1 EDG engine/generator sets are cooled using forced air ventilation with integral fans (blowers). Although the forced air provided by these fans/blowers is not combustion air, it is evaluated with the corresponding Auxiliary System that provides forced air to the engine of each EDG.

The synchronous generators of the Unit 2 EDG engine/generator sets are cooled by rotating blades attached internally to the generator rotors. The blades draw air in through both end cover screens, force air flow past the stator and exhaust it through side vents to ambient. Although the forced air provided by these internal blades is not combustion air, it is evaluated with the corresponding Auxiliary System that provides forced air to the engine of each EDG.

System Intended Functions

EDG System

10 CFR 54.4(a)(1):

- Powers the emergency loads (as required) up to the full load rating of the engine for up to 7 days; and,
- Supplies AC power to the emergency buses of the 4kV Station Service System ensuring required power for safe shutdown.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Supplies AC power to the emergency buses of the 4kV Station Service System ensuring required power for safe shutdown (FP).
- Provides an alternate AC power source of sufficient capacity and capability to operate opposite unit SBO loads (during hours 1 to 4) (SBO); and,
- Provides an alternate AC source with a target reliability of 0.975 (SBO).

EDG Air Intake and Exhaust System

10 CFR 54.4(a)(1):

- Provides needed support for the reliable operation of the diesel engine.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3): None, except as a combined support for the EDGs.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 8.5.2.4	Section 9.5.8

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-36-5	**LR 2-36-2**

Components Subject to Aging Management Review

Table 2.3.3-11 lists the component types that require aging management review and their intended functions.

Table 3.3.2-11, *Auxiliary Systems – Emergency Diesel Generators and Air Intake and Exhaust System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-11
Emergency Diesel Generators and Air Intake and Exhaust System Components Subject to Aging Management Review

Component Type	Intended Function
Blower housing (Unit 1 only)	Pressure boundary
Bolting	Pressure boundary
Expansion joint	Pressure boundary
Filter housing	Pressure boundary
Flexible hose	Pressure boundary
Heat exchanger	Heat transfer Pressure boundary
Piping	Pressure boundary
Silencer	Pressure boundary
Tubing	Pressure boundary
Turbocharger housing	Pressure boundary
Valve body	Pressure boundary

2.3.3.12 Emergency Diesel Generators—Air Start System

Each EDG includes mechanical support equipment that can be grouped into six subsystems, addressed as identified in the following Sections:

1. Emergency Diesel Generators and Air Intake and Exhaust System (Section 2.3.3.11)
2. Emergency Diesel Generators—Air Start System (see System Description following this list)
3. Emergency Diesel Generators—Crankcase Vacuum System (Section 2.3.3.13)
4. Emergency Diesel Generators—Fuel Oil System (Section 2.3.3.14)
5. Emergency Diesel Generators—Lube Oil System (Section 2.3.3.15)
6. Emergency Diesel Generators—Water Cooling System (Section 2.3.3.16)

System Description

Each emergency diesel is provided with an Air Start System sized for five generator starts without outside power.

There are two independent Air Start Systems for each EDG, either of which is capable of starting the engine. The diesel Air Start Systems are comprised of air compressors, coolers, dryers, separators, tanks, air motors (including the Unit 2 air start distributors), and the necessary piping, valves, fittings, and I&C systems.

The Unit 1 Air Start System rotates the engine using air motors, while the Unit 2 system rotates the engine by porting starting air to the cylinders via a start air distributor. The distributor will be referred to as a motor in this application.

The Unit 2 Air Start System also includes a skid-mounted air tank in the supply line to the servo fuel rack shutdown and fuel rack booster to ensure a source of air for positive fuel shutoff.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides stored air capable of ensuring enough air for a minimum number of starts per diesel generator unit.

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3): None, except as a combined support for the EDGs.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 8.5.2.3	Section 9.5.6

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-36-1	**LR 2-36-3**

Components Subject to Aging Management Review

Table 2.3.3-12 lists the component types that require aging management review and their intended functions.

Table 3.3.2-12, *Auxiliary Systems – Emergency Diesel Generators—Air Start System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-12
Emergency Diesel Generators—Air Start System
Components Subject to Aging Management Review

Component Type	Intended Function
Air Dryer (Unit 2 only)	Leakage boundary (spatial)
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Filter housing	Pressure boundary
Flexible hose	Leakage boundary (spatial) Pressure boundary
Heat exchanger	Structural integrity (attached)
Injector	Pressure boundary
Moisture separator	Leakage boundary (spatial)
Motor casing	Pressure boundary
Orifice	Flow restriction Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Strainer body	Pressure boundary Structural integrity (attached)
Tank	Pressure boundary Structural integrity (attached)
Trap body	Leakage boundary (spatial)
Tubing	Leakage boundary (spatial) Pressure boundary
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.3.13 Emergency Diesel Generators—Crankcase Vacuum System

Each EDG includes mechanical support equipment that can be grouped into six subsystems, addressed as identified in the following Sections:

1. Emergency Diesel Generators and Air Intake and Exhaust System (Section 2.3.3.11)
2. Emergency Diesel Generators—Air Start System (Section 2.3.3.12)
3. Emergency Diesel Generators—Crankcase Vacuum System (see System Description following this list)
4. Emergency Diesel Generators—Fuel Oil System (Section 2.3.3.14)
5. Emergency Diesel Generators—Lube Oil System (Section 2.3.3.15)
6. Emergency Diesel Generators—Water Cooling System (Section 2.3.3.16)

System Description

The EDGs at BVPS Unit 1 and Unit 2 have a Crankcase Vacuum System designed to remove oil vapors from the EDGs during operation, but the systems function differently at each unit.

The EDGs for Unit 1 are each equipped with a lube oil separator that is mounted on the turbocharger housing. An ejector assembly mounted on the lube oil separator cover is connected to an eductor tube in the exhaust stack by a flanged tube. During engine operation, air pressure from the discharge of the turbocharger compressor passes through the ejector assembly, creating a suction which draws up engine oil vapors through an internal screen element. Oil that collects on the screen element drains back into the engine. The remaining gaseous vapor is discharged to the exhaust stack and vented to the atmosphere. The oil separator, eductor assembly, air pressure from the turbocharger compressor and exhaust stack suction function together to form a functional crankcase vacuum system. The Unit 1 Crankcase Vacuum System has no moving parts, and is not essential to the safe, reliable operation of the diesel engine, except to maintain a pressure boundary for proper operation of the air intake and exhaust system.

The Unit 2 Crankcase Vacuum System includes a crankcase vacuum pump, moisture (oil) separator, piping and fittings. The Crankcase Vacuum System removes oil vapors from the diesel engine crankcase. The operation of the Crankcase Vacuum System is not essential to the safe, reliable operation of the diesel engine, but the subsystem includes safety-related instrumentation and associated tubing and valves.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides needed support for reliable operation of the diesel engine.

10 CFR 54.4(a)(2):

- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs. (Note: The crankcase vacuum return lines that are attached to the safety-related EDG crankcase do not provide mechanical support for that component.)

10 CFR 54.4(a)(3): None, except as a combined support for the EDGs.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
--	Section 9.5.7

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
--	**LR 2-36-2**

Components Subject to Aging Management Review

Table 2.3.3-13 lists the component types that require aging management review and their intended functions.

Table 3.3.2-13, *Auxiliary Systems – Emergency Diesel Generators—Crankcase Vacuum System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-13
Emergency Diesel Generators—Crankcase Vacuum System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary
Expansion joint	Pressure boundary
Flexible hose	Leakage boundary (spatial)
Moisture separator	Leakage boundary (spatial) Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary
Tubing	Pressure boundary
Valve body	Leakage boundary (spatial) Pressure boundary

2.3.3.14 Emergency Diesel Generators—Fuel Oil System

Each EDG includes mechanical support equipment that can be grouped into six subsystems, addressed as identified in the following Sections:

1. Emergency Diesel Generators and Air Intake and Exhaust System (Section 2.3.3.11)
2. Emergency Diesel Generators—Air Start System (Section 2.3.3.12)
3. Emergency Diesel Generators—Crankcase Vacuum System (Section 2.3.3.13)
4. Emergency Diesel Generators—Fuel Oil System (see System Description following this list)
5. Emergency Diesel Generators—Lube Oil System (Section 2.3.3.15)
6. Emergency Diesel Generators—Water Cooling System (Section 2.3.3.16)

System Description

The EDG Fuel Oil System is a safety-related system which stores fuel oil for the EDGs during normal operation and supplies fuel oil to the diesel generator fuel oil pumps when they are required to operate. The Fuel Oil System consists of underground fuel oil storage tanks, transfer pumps, day tanks, engine-mounted fuel pumps and tanks, injectors, and associated piping and valves.

The Unit 1 fuel oil inventory is sized to support operation of one diesel generator for 7 days. The Unit 2 system can support operation of both diesels for 7 days.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides a supply of fuel oil to each Emergency Diesel Generator to ensure 7 days of continuous full load operation (Unit 1 supply is sufficient for 7 days of operation of only one generator).

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3): None, except as a combined support for the EDGs.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 8.5.2.3 9.14.4.1	Section 9.5.4

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-36-2	**LR 2-36-1**

Components Subject to Aging Management Review

Table 2.3.3-14 lists the component types that require aging management review and their intended functions.

Table 3.3.2-14, *Auxiliary Systems – Emergency Diesel Generators—Fuel Oil System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-14
Emergency Diesel Generators—Fuel Oil System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Filter housing	Pressure boundary
Flame arrestor	Flame suppression
Flexible hose (Unit 2 only)	Pressure boundary
Orifice	Flow restriction Pressure boundary Structural integrity (attached)
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Pump casing	Pressure boundary
Sight glass	Leakage boundary (spatial) Pressure boundary

Table 2.3.3-14
Emergency Diesel Generators—Fuel Oil System
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Strainer body	Leakage boundary (spatial) Pressure boundary
Strainer element	Filtration
Tank	Pressure boundary
Tubing	Pressure boundary
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.3.15 Emergency Diesel Generators—Lube Oil System

Each EDG includes mechanical support equipment that can be grouped into six subsystems, addressed as identified in the following Sections:

1. Emergency Diesel Generators and Air Intake and Exhaust System (Section 2.3.3.11)
2. Emergency Diesel Generators—Air Start System (Section 2.3.3.12)
3. Emergency Diesel Generators—Crankcase Vacuum System (Section 2.3.3.13)
4. Emergency Diesel Generators—Fuel Oil System (Section 2.3.3.14)
5. Emergency Diesel Generators—Lube Oil System (see System Description following this list)
6. Emergency Diesel Generators—Water Cooling System (Section 2.3.3.16)

System Description

The EDG Lube Oil System provides essential lubrication to the components of the Emergency Diesel Generator. Included in the lubrication oil system for each engine are lube oil pumps, heat exchangers and associated piping components and valves.

Both units include provisions to maintain the lubricating oil warm during standby operation. At Unit 1, when the engine is shutdown, the lube oil cooler operates as a lube oil heater. Water, heated by immersion heaters, is used to heat the oil in the lube oil cooler. The auxiliary oil system operates continuously and supplies warmed oil to the turbocharger and engine sump when the engine is shutdown. At Unit 2, electric pumps operate continuously during the standby condition to circulate oil through the electric keep-warm heater and to other essential parts.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides lubricating oil essential for the operation of the diesel engine.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3): None, except as a combined support for the EDGs.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 8.5.2.3	Section 9.5.7

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-36-3	**LR 2-36-4A**
LR 1-36-4	**LR 2-36-4B**
--	**LR 2-36-5A**
--	**LR 2-36-5B**

Components Subject to Aging Management Review

Table 2.3.3-15 lists the component types that require aging management review and their intended functions.

Table 3.3.2-15, *Auxiliary Systems – Emergency Diesel Generators—Lube Oil System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-15
Emergency Diesel Generators—Lube Oil System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure boundary
Filter housing	Pressure boundary
Flexible hose	Pressure boundary
Heat exchanger	Heat transfer Pressure boundary
Heater housing	Pressure boundary
Orifice	Flow restriction Pressure boundary
Piping	Pressure boundary
Pump casing	Pressure boundary
Sight glass	Pressure boundary
Strainer body	Pressure boundary
Strainer element	Filtration
Tank	Pressure boundary
Tubing	Pressure boundary
Valve body	Pressure boundary

2.3.3.16 Emergency Diesel Generators—Water Cooling System

Each EDG includes mechanical support equipment that can be grouped into six subsystems, addressed as identified in the following Sections:

1. Emergency Diesel Generators and Air Intake and Exhaust System (Section 2.3.3.11)
2. Emergency Diesel Generators—Air Start System (Section 2.3.3.12)

3. Emergency Diesel Generators—Crankcase Vacuum System (Section 2.3.3.13)
4. Emergency Diesel Generators—Fuel Oil System (Section 2.3.3.14)
5. Emergency Diesel Generators—Lube Oil System (Section 2.3.3.15)
6. Emergency Diesel Generators—Water Cooling System (see System Description following this list)

System Description

The EDG Water Cooling System supplies water to cool the various diesel engine components. It consists of circulating pumps, water temperature regulating valves, water expansion tanks, electric heaters, heat exchangers, and the associated piping components, valves, and I&C.

The EDG cooling water system heat exchangers are cooled with water from the River Water System (Unit 1 only) or Service Water System (Unit 2 only).

System Intended Functions

10 CFR 54.4(a)(1):

- Provides cooling water essential for the operation of the diesel engines.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3): None, except as a combined support for the EDGs.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
8.5.2.3	9.5.5

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-36-3	**LR 2-36-4A**
LR 1-36-4	**LR 2-36-4B**
--	**LR 2-36-5A**
--	**LR 2-36-5B**

Components Subject to Aging Management Review

Table 2.3.3-16 lists the component types that require aging management review and their intended functions.

Table 3.3.2-16, *Auxiliary Systems – Emergency Diesel Generators—Water Cooling System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-16
Emergency Diesel Generators—Water Cooling System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure boundary
Flexible hose	Pressure boundary
Heat exchanger	Heat transfer Pressure boundary
Heater housing	Pressure boundary
Orifice	Flow restriction Pressure boundary
Piping	Pressure boundary
Pump casing	Pressure boundary
Sight glass	Pressure boundary
Tank	Pressure boundary

Table 2.3.3-16
Emergency Diesel Generators—Water Cooling System
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Tubing	Pressure boundary
Valve body	Pressure boundary

2.3.3.17 Emergency Response Facility Substation System (Common)

System Description

The Emergency Response Facility (ERF) Substation System is common to Unit 1 and Unit 2. The system receives standby power from a diesel generator. The diesel generator supplies power to the ERF Substation 4kV switchgear for selected equipment in the ERF Substation, the ERF, and Unit 1 and Unit 2.

The ERF diesel generator includes mechanical support equipment that is grouped into the following subsystems:

- Air Intake and Exhaust System;
- Fuel Oil System;
- Lube Oil System; and,
- Water Cooling System.

Air Intake and Exhaust System

A turbocharger is used to supply combustion air. The turbocharger is mounted at the generator end of the engine and consists of an exhaust-driven turbine unit and a centrifugal air compressor, contained within a single housing and mounted on a common shaft. An exhaust muffler / silencer is located downstream of the turbocharger exhaust outlet.

Fuel Oil System

The diesel generator Fuel Oil System consists of pumps, tanks, filters, strainers, fuel injectors and associated valves, piping and instrumentation. This system does not incorporate an engine-mounted day tank.

The fuel oil transfer pumps, located in a below-grade enclosure, draw fuel oil from the underground fuel oil storage tank located northwest of the BVPS Switchyard Relay Building. The pumps transfer fuel oil to the fuel oil day tank located in the ERF Diesel Generator Building. The storage tank has the capacity to provide diesel operation for 7 days. Fuel oil is supplied from the day tank to the diesel fuel injectors by an engine-mounted fuel pump and a DC-powered fuel priming pump.

Lube Oil System

The diesel engine has a Lube Oil System which is a combination of four separate systems. These are the main lubricating system, the piston cooling system, auxiliary oil system and the scavenging oil system. Each system has its own oil pump.

Auxiliary motor-driven pumps operate continuously to circulate oil from the lube oil sump to the lube oil cooler. These pumps circulate warm oil through the oil system to keep the engine in a state of readiness for an immediate start and loading sequence.

Water Cooling System

The Water Cooling System for the diesel consists of an expansion tank, centrifugal circulating pumps, standby immersion heater, thermostatic control valve and radiator.

The diesel is furnished with an outside radiator to remove heat from the cooling water. The diesel radiator is located to the east of the ERF Diesel Generator Building and is equipped with two fans. Circulating pumps provide flow through the radiator. An electric immersion heater is provided for standby heating of the diesel engine's cooling water and lube oil.

System Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides backup power from the ERF diesel generator to the alternate communications system (FP);
- Supplies the Unit 1 dedicated auxiliary feedwater pump with a highly reliable source of electrical power (FP) (Unit 1 only); and,
- Provides power to the AMSAC logic cabinet (ATWS).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 8.4.5	None

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-58E-1	None
LR 1-58E-2	--
LR 1-58E-3	--

Components Subject to Aging Management Review

Table 2.3.3-17 lists the component types that require aging management review and their intended functions.

Table 3.3.2-17, *Auxiliary Systems – Emergency Response Facility Substation System (Common) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-17
Emergency Response Facility Substation System (Common)
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure boundary
Expansion joint	Pressure boundary
Filter housing	Pressure boundary
Flexible hose	Pressure boundary
Heat exchanger	Heat transfer Pressure boundary

Table 2.3.3-17
Emergency Response Facility Substation System (Common)
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Heater housing	Pressure boundary
Orifice	Flow restriction Pressure boundary
Piping	Pressure boundary
Pump casing	Pressure boundary
Sight glass	Pressure boundary
Silencer	Pressure boundary
Strainer body	Pressure boundary
Strainer element	Filtration
Tank	Pressure boundary
Tubing	Pressure boundary
Turbocharger housing	Pressure boundary
Valve body	Pressure boundary

2.3.3.18 Fire Protection System

System Description

The Fire Protection System is designed to detect and suppress fires in protected structures such that any single fire will not cause an unacceptable risk to public health and safety, will not prevent the performance of necessary safe shutdown functions, and will not significantly increase the risk of radioactive release to the environment.

The Fire Protection System consists of a number of subsystems which provide detection, suppression, fire barrier, combustible oil collection, and operational aid in shutdown functions.

The water suppression subsystem is supplied by two fire pumps (one motor-driven and one diesel-driven). Both pumps are located in the Intake Structure, where they take suction from the Ohio River and discharge to the yard fire loop. The yard loop supplies fire hydrants, hose stations and sprinkler systems throughout the plant. The water suppression system consists of pumps, piping, hydrants, hose stations, manual valves, deluge valves and sprinkler heads. Hydrants are located and used to protect the yard areas. Hose stations are located in buildings for internal use.

The carbon dioxide suppression subsystem consists of refrigeration units for area and equipment enclosure protection. Carbon dioxide discharge may be initiated automatically or manually. Upon actuation of these systems, an alarm sounds in the affected area to permit personnel to exit the area before discharge of the carbon dioxide.

Halon fire extinguishing subsystems are utilized for suppression in areas where electronic computer parts or equipment is used. The systems may be actuated either automatically or manually.

The fire detection subsystem consists of smoke and heat sensitive devices (and ultraviolet flame detectors at Unit 2) monitoring various areas of the plant. When smoke or heat is sensed by any of the fire detection devices, a fire alarm is sounded and the area fire alarm is displayed in the Control Room.

The reactor coolant pumps have been equipped with an oil collection system capable of collecting lube oil from the reactor coolant pump lube oil system. The system collects oil leakage and drains it to containers that can hold the entire reactor coolant pump lube oil inventory.

The fire barrier subsystems are those elements of construction that are rated in hours of fire resistance to prevent the spread of fires. These fire barrier components are addressed as Bulk Structural Commodities in Section 2.4.36.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides the means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97; and,
- Provides a Containment isolation function.

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ;

- Eliminates the reactor coolant pump oil system as a potential cause of a Containment fire (FP);
- Provides fire wrap to protect cables and ventilation system ductwork (FP);
- Provides automatic or manual CO_2 fire suppression capability (FP);
- Provides automatic or manual Halon fire suppression system capability (FP);
- Provides automatic and manually activated water suppression system capability (FP);
- Provides automatic early warning fire detection in required areas containing safety-related equipment (FP);
- Provides suppression and detection for ventilation charcoal filtration systems (FP);
- Provides local and remote annunciation of alarm and trouble conditions for: the detection systems; fire suppression systems; the motor-driven fire pump (Unit 1 only); the diesel-driven fire pump (Unit 1 only) (FP);
- Provides portable fire extinguishers (FP);
- Provides self-contained breathing apparatus for fire brigade and control room operator use (FP);
- Provides emergency lights for Appendix R safe shutdown lighting (FP);
- Facilitates removal of false floor panel sections in Control Room to enhance fire fighting capability (FP) (Unit 1 only);
- Provides passive structural components (e.g., fire doors, penetration seals, and fire dampers) used to prevent the spread of fire (FP) (Unit 1 only);
- Provides remote shutdown capability (FP) (Unit 1 only);
- Provides service to the BVPS Unit 2 fire loop (via the Unit 1 engine-driven and motor-driven fire pumps) (FP) (Unit 1 only);
- Supplies the fire suppression water systems with water from the Ohio River via a motor-driven fire pump and a diesel-driven fire pump (FP) (Unit 1 only);
- Provides slag filled sumps around transformers to prevent spreading of, and cooling of, hot oil (FP) (Unit 2 only);
- Provides water shields and baffles to prevent water damage to electrical equipment from automatic water suppression systems (FP) (Unit 2 only);
- Provides water supply to underground yard fire main, interior fire mains, fire hydrants, and hose stations (FP) (Unit 2 only); and,
- Provides rated fire barriers (i.e., mechanical) to prevent the spread of fires (FP) (Unit 2 only).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 9.10	Section 9.5.1

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-06-3	LR 1-33-1
LR 1-30-1	LR 1-33-2
LR 1-33-1	LR 2-06-2
LR 1-33-2	LR 2-16-1
LR 1-33-3	LR 2-16-2
LR 1-33-4	LR 2-30-1
LR 1-33-7	**LR 2-33-1A**
LR 1-33-8	**LR 2-33-1B**
LR 2-33-1A	**LR 2-33-1C**
LR 2-33-1B	**LR 2-33-1D**
--	**LR 2-33-1E**
--	**LR 2-33-1F**
--	**LR 2-33-2A**
--	**LR 2-33-2B**
--	**LR 2-33-3**
--	LR 2-44A-1
--	LR 2-44A-2
--	LR 2-44B-2
--	LR 2-44B-3
--	LR 2-44C-2
--	LR 2-44F-5

Components Subject to Aging Management Review

Table 2.3.3-18 lists the component types that require aging management review and their intended functions.

Table 3.3.2-18, *Auxiliary Systems – Fire Protection System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-18
Fire Protection System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary
Expansion joint	Pressure boundary
Flame arrestor	Flame suppression
Flexible hose	Pressure boundary
Heat exchanger	Heat transfer Pressure boundary
Hose rack	Pressure boundary
Nozzle	Direct flow
Orifice	Flow restriction Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary
Pump casing	Pressure boundary
Sight glass	Pressure boundary
Silencer	Pressure boundary
Strainer body	Pressure boundary
Tank	Pressure boundary
Tubing	Pressure boundary
Valve body	Leakage boundary (spatial) Pressure boundary

2.3.3.19 Fuel Pool Cooling and Purification System

System Description

The Fuel Pool Cooling and Purification System is a safety-related system that is designed to remove the heat generated by the stored spent fuel assemblies, to maintain optical clarity of the water in the spent fuel storage pool and the refueling cavity, and to permit unrestricted access to the working area both in and around the spent fuel storage pool.

The Fuel Pool Cooling and Purification System consists of two subsystems: the Fuel Pool Cooling subsystem, and the Fuel Pool Purification subsystem. The Fuel Pool Cooling subsystem consists of two circulating pumps, two heat exchangers and the necessary piping and valves. This subsystem can be configured to allow either pump to flow through either heat exchanger to control temperature and level of the fuel pool.

The Fuel Pool Purification subsystem consists of two circulating pumps, two filters, one demineralizer and the necessary piping and valves. This subsystem can be configured to allow either pump to flow through either filter to:

- control the clarity and purity of the fuel pool,
- support operation of the refueling cavity during refueling,
- provide cleanup capability for the RWST, and
- provide a source of emergency makeup water to the RWST.

Diverse makeup sources for the spent fuel pool are available from the Boron Recovery System (i.e., primary grade water), the Service Water System (Unit 2 only), the Containment Depressurization System (i.e., the RWST), and the Fire Protection System (i.e., via hose racks).

System Intended Functions

10 CFR 54.4(a)(1):

- Provides a Containment isolation function; and,
- Removes decay and sensible heat from the spent fuel pool to control the pool water temperature to within acceptable limits.

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ (Unit 2 only).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
9.5	9.1.3

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-13-1	LR 2-15-5
LR 1-15-2	LR 2-18-1
LR 1-18-3	**LR 2-20-1**
LR 1-20-1	--

Components Subject to Aging Management Review

Table 2.3.3-19 lists the component types that require aging management review and their intended functions.

Table 3.3.2-19, *Auxiliary Systems – Fuel Pool Cooling and Purification System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-19
Fuel Pool Cooling and Purification System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Demineralizer	Leakage boundary (spatial)
Expansion joint	Leakage boundary (spatial) Pressure boundary
Filter	Leakage boundary (spatial)
Flexible hose	Leakage boundary (spatial) Pressure boundary
Heat exchanger	Heat transfer Pressure boundary
Orifice	Flow restriction Leakage boundary (spatial) Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Pump casing	Leakage boundary (spatial) Pressure boundary
Strainer body	Leakage boundary (spatial) Pressure boundary
Tank	Leakage boundary (spatial)
Tubing	Leakage boundary (spatial) Pressure boundary
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.3.20 Gaseous Waste Disposal System

System Description

The Gaseous Waste Disposal System is a nonsafety-related system. Its purpose is to control, collect, process, handle, store, recycle, and dispose of all gaseous radioactive waste generated as a result of plant operation.

The Gaseous Waste Disposal System processes and (via the Radiation Monitoring System, Section 2.3.3.25) monitors all waste gas streams prior to discharge to the atmosphere. The system provides decay time for degasifier gaseous effluent, and for the offgas stream from the condenser air ejector, as necessary. The system provides for recycling of the hydrogen present in the degasifier overheads back to the volume control tank.

All gaseous waste effluent not recycled is directed to the Gaseous Waste Disposal System for disposal. The provision for storing gases generated from either unit going to cold shutdown is also provided.

System Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs (Unit 1 only); and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3): None

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 11.2.3	Section 11.3

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-19-1	LR 2-15-6
LR 1-19-2	**LR 2-19-1**
--	**LR 2-19-2**
--	LR 2-29-2

Components Subject to Aging Management Review

Table 2.3.3-20 lists the component types that require aging management review and their intended functions.

Table 3.3.2-20, *Auxiliary Systems – Gaseous Waste Disposal System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-20
Gaseous Waste Disposal System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Structural integrity (attached)
Filter housing	Leakage boundary (spatial)
Heat exchanger	Leakage boundary (spatial)
Piping	Leakage boundary (spatial) Structural integrity (attached)
Sight glass	Leakage boundary (spatial)
Strainer body	Leakage boundary (spatial)
Tank	Leakage boundary (spatial)
Trap body	Leakage boundary (spatial)

**Table 2.3.3-20
Gaseous Waste Disposal System
Components Subject to Aging Management Review
(continued)**

Component Type	Intended Function
Tubing	Leakage boundary (spatial)
Valve body	Leakage boundary (spatial) Structural integrity (attached)

2.3.3.21 Liquid Waste Disposal System

System Description

The Liquid Waste Disposal System is a nonsafety-related system designed to process liquid waste to meet the requirements of 10 CFR 20. The system collects, processes, and disposes of liquid radioactive waste generated as a result of normal plant operation, including normal operational transitions.

The Liquid Waste Disposal System consists of tanks, filters, pumps, heat exchangers, evaporators, demineralizers, and associated equipment, piping, valves and instrumentation necessary for operation and control.

Liquid effluents in the reactor plant enter the Reactor Plant Vent and Drain System. Aerated wastes are routed to the Liquid Waste Disposal System. The system can process waste from the opposite unit.

Waste liquid from building sumps must be processed so that the liquid will be suitable for discharge to the river with dilution only. Although the system has the capability to process liquid waste with an evaporator, currently the evaporator is not used and demineralizers are used to process liquid waste.

System Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2):

- The integrity of nonsafety-related, fluid-retaining components in safety-related areas prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3): None

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 11.2.4	Section 11.2

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-15-2	**LR 2-17-1**
LR 1-17-1	--
LR 1-17-2	--
LR 1-17-3	--
LR 1-18-3	--
LR 1-27-2	--

Components Subject to Aging Management Review

Table 2.3.3-21 lists the component types that require aging management review and their intended functions.

Table 3.3.2-21, *Auxiliary Systems – Liquid Waste Disposal System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-21
Liquid Waste Disposal System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (spatial)
Demineralizer	Leakage Boundary (spatial)

Table 2.3.3-21
Liquid Waste Disposal System
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Filter housing	Leakage Boundary (spatial)
Flexible hose	Leakage Boundary (spatial)
Heat exchanger	Leakage Boundary (spatial)
Heater housing	Leakage Boundary (spatial)
Orifice	Leakage Boundary (spatial)
Piping	Leakage Boundary (spatial)
Pump casing	Leakage Boundary (spatial)
Strainer body	Leakage Boundary (spatial)
Tank	Leakage Boundary (spatial)
Tubing	Leakage Boundary (spatial)
Valve body	Leakage Boundary (spatial)

2.3.3.22 Post-Accident Sample System

System Description

The Post-Accident Sample System is no longer credited by the BVPS current licensing basis for its sampling function.

The Post-Accident Sample System was designed to draw reactor coolant, Containment atmosphere, and Containment sump samples after a design basis accident. The system is no longer credited for this function, but the equipment remains in place, along with the associated sample piping and valves.

The Unit 2 Post-Accident Sample System includes a Containment penetration that no longer supports the system sampling function.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides a Containment isolation function (Unit 2 only).

10 CFR 54.4(a)(2):

- The integrity of nonsafety-related, fluid-retaining components in safety-related areas prevents interactions that could affect safety-related SSCs; and,
- Nonsafety-related piping up to an including the first equivalent anchor beyond the safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs.

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
None	Section 12.2.1.3.3 Table 6.2-60

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-14C-1	**LR 2-14C-1**
--	**LR 2-14C-2**

Components Subject to Aging Management Review

Table 2.3.3-22 lists the component types that require aging management review and their intended functions.

Table 3.3.2-22, *Auxiliary Systems – Post-Accident Sample System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-22
Post-Accident Sample System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)
Drip Pan	Leakage Boundary (spatial)
Heat Exchanger	Leakage Boundary (spatial)
Piping	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)
Pump Casing	Leakage Boundary (spatial)
Sample Capsule	Leakage Boundary (spatial)
Sample Panel	Leakage Boundary (spatial)
Strainer Body	Leakage Boundary (spatial)
Tank	Leakage Boundary (spatial)
Tubing	Leakage Boundary (spatial)
Valve Body	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)

2.3.3.23 Post-Design Basis Accident Hydrogen Control System

System Description

10 CFR 50.44 was revised in 2003 to eliminate the requirement for hydrogen recombiners and hydrogen purge systems. The recombiners have been retired, but some components remain, including Containment penetrations and purge components.

The system includes redundant hydrogen analyzers and associated piping and valves. Containment samples are obtained through independent sample lines for each analyzer.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides a Containment isolation function;
- Provides the means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97; and,
- Provides the means to analyze the Containment atmosphere following a design basis accident for the concentration of hydrogen gas.

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs.

10 CFR 54.4(a)(3):

- System contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 6.5	Section 6.2.5

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-46-1	LR 2-12-1
LR 1-46-2	**LR 2-46-1**

Components Subject to Aging Management Review

Table 2.3.3-23 lists the component types that require aging management review and their intended functions.

Table 3.3.2-23, *Auxiliary Systems – Post-Design Basis Accident Hydrogen Control System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-23
Post-Design Basis Accident Hydrogen Control System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure boundary Structural integrity (attached)
Expansion joint	Structural integrity (attached)
Fan housing	Structural integrity (attached)
Filter housing	Structural integrity (attached)
Flexible hose	Pressure boundary
Orifice	Structural integrity (attached)
Piping	Pressure boundary Structural integrity (attached)
Pump casing	Pressure boundary
Rupture disc	Pressure boundary
Tubing	Pressure boundary
Valve body	Pressure boundary Structural integrity (attached)

2.3.3.24 Primary Component and Neutron Shield Tank Cooling Water System

System Description

The Primary Component and Neutron Shield Tank Cooling Water System is a safety-related system that provides cooling water for the removal of heat from reactor plant components during normal operations and the RHR System heat exchangers during plant cooldown. The system also supplies normal makeup to the neutron shield expansion tank.

The Primary Component and Neutron Shield Tank Cooling Water System consists of three circulating pumps arranged in parallel, three heat exchangers in parallel and the necessary piping and valves to supply cooling water to various parallel loads. The neutron shield tank cooling is provided by a natural circulation closed loop subsystem, which is supplied with cooling water from the main system.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides reactor coolant pressure boundary (in the event of a reactor coolant pump thermal barrier heat exchanger tube leak);
- Provides the means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97;
- Provides a source of cooling water for various safety-related components;
- Provides a Containment isolation function;
- Provides cooling water to the reactor coolant pump thermal barrier; and,
- Provides cooling water for removal of heat from the RHR heat exchangers to achieve plant cold shutdown conditions (Unit 2 only).

Additionally, the neutron shield tank performs a structural function to provide support to the Reactor Vessel. That function, and the management of that function, is addressed with the Reactor Containment Building, Section 2.4.22.

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs.
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ;
- Maintains minimum flow for the operating river water pump (FP) (Unit 1 only);
- Provides cooling water to the RHR heat exchangers, non-regenerative and seal water heat exchangers, reactor coolant pump thermal barrier heat exchangers, Containment penetration cooling coils, and RHR pump seal coolers during post-fire shutdown and cooldown (FP) (Unit 2 only);
- Provides a flow path through one component cooling water heat exchanger (not required for heat load removal) to maintain minimum flow for the operating river water pump (SBO) (Unit 1 only); and,
- Provides a flow path through one component cooling water heat exchanger (not required for heat load removal) to the Emergency Outfall Structure (SBO) (Unit 2 only).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 9.4	Section 9.2.2.1

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-06-3	LR 2-06-2
LR 1-07-1	LR 2-07-1A
LR 1-07-4	LR 2-07-3
LR 1-08-1	LR 2-08-1
LR 1-08-2	LR 2-08-2
LR 1-08-3	LR 2-09-1
LR 1-08-4	LR 2-10-1
LR 1-10-1	LR 2-14A-1

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-14A-1	LR 2-14A-2
LR 1-15-1	**LR 2-15-1**
LR 1-15-2	**LR 2-15-2**
LR 1-15-3	**LR 2-15-3**
LR 1-15-4	**LR 2-15-4**
LR 1-15-5	**LR 2-15-5**
LR 1-17-2	**LR 2-15-6**
LR 1-19-1	LR 2-19-1
LR 1-20-1	LR 2-20-1
LR 1-25-1	LR 2-25-4
LR 1-27-2	LR 2-27A-2
LR 1-30-3	LR 2-30-3
LR 1-43-3	LR 2-34-3
--	LR 2-43-16
--	LR 2-44C-2

Components Subject to Aging Management Review

Table 2.3.3-24 lists the component types that require aging management review and their intended functions.

Table 3.3.2-24, *Auxiliary Systems – Primary Component and Neutron Shield Tank Cooling Water System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-24
Primary Component and Neutron Shield Tank Cooling Water System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Expansion joint	Pressure boundary

Table 2.3.3-24
Primary Component and Neutron Shield Tank Cooling Water System Components Subject to Aging Management Review (continued)

Component Type	Intended Function
Flexible hose	Leakage boundary (spatial) Pressure boundary
Heat exchanger	Heat transfer Leakage boundary (spatial) Pressure boundary
Orifice	Flow restriction Leakage boundary (spatial) Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Pump casing	Pressure boundary
Sight glass	Leakage boundary (spatial)
Strainer body	Leakage boundary (spatial)
Tank	Leakage boundary (spatial) Pressure boundary
Tubing	Leakage boundary (spatial) Pressure boundary
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.3.25 Radiation Monitoring System

System Description

The Radiation Monitoring System at BVPS is a safety-related system that provides process, effluent, and area radiation monitoring for the plants. The system is designed to detect, compute, indicate, annunciate, and record the levels of radioactivity inside the plant.

The Unit 1 Radiation Monitoring System includes process and effluent monitors that give early warning of plant malfunctions and record and limit the discharge of radioactive fluids and gases to the environment. Area radiation monitors warn personnel of increasing radiation levels at fixed locations in the plant.

The Unit 2 Radiation Monitor System consists of various process, effluent and area radiation monitors that transmit data to the Digital Radiation Monitoring System central processors, which are located in the Main Control Room. The system initiates alarm messages when the parameters being monitored exceed pre-determined reference values. Area radiation monitors warn personnel of increasing radiation levels at fixed locations in the plant.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides for the detection and indication of radioactivity levels inside the plant;
- Causes the automatic actuation of safety-related components to control or terminate radioactive releases; and,
- Provides the means for assessing plant conditions during and following an accident in support of R.G. 1.97.

10 CFR 54.4(a)(2):

- The integrity of nonsafety-related, fluid-retaining components in safety-related areas prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ; and,
- Monitors the release of potentially contaminated smoke and gas to the environment (FP).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 11.3	Section 11.5

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-07-1	LR 2-12-1
LR 1-15-1	LR 2-16-1
LR 1-16-1	LR 2-16-2
LR 1-17-1	LR 2-25-4
LR 1-19-1	LR 2-30-3
LR 1-43-2	**LR 2-43-16**
LR 1-43-3	**LR 2-43-18**
LR 1-43-5	**LR 2-43-21**
--	**LR 2-43-22**

Components Subject to Aging Management Review

Table 2.3.3-25 lists the component types that require aging management review and their intended functions.

Table 3.3.2-25, *Auxiliary Systems – Radiation Monitoring System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-25
Radiation Monitoring System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (spatial) Pressure Boundary
Filter housing	Pressure Boundary
Heat exchanger	Heat Transfer Leakage Boundary (spatial) Pressure Boundary

**Table 2.3.3-25
Radiation Monitoring System
Components Subject to Aging Management Review
(continued)**

Component Type	Intended Function
Isokinetic nozzle	Pressure Boundary
Piping	Leakage Boundary (spatial) Pressure Boundary
Pump casing	Leakage Boundary (spatial) Pressure Boundary
Radiation monitor	Leakage Boundary (spatial) Pressure Boundary
Tubing	Leakage Boundary (spatial) Pressure Boundary
Valve body	Leakage Boundary (spatial) Pressure Boundary

2.3.3.26 Reactor Plant Sample System

System Description

The Reactor Plant Sample System is a safety-related system that transfers liquid and gaseous samples from the various contaminated and potentially contaminated systems to the primary sample panel for monitoring and/or collection of grab samples, or pressurized vessel samples for laboratory analysis. The Steam Generator Blowdown Sample System is considered to be part of the Reactor Plant Sample System, and provides continuous and automatic sampling and radiation monitoring of steam generator blowdown.

System Intended Functions

10 CFR 54.4(a)(1):

- Forms part of the RCS boundary;
- Provides the means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97;
- Provides for the automatic isolation of the steam generator sample lines following the start of one of the auxiliary feedwater pumps; and,

- Provides a Containment isolation function.

10 CFR 54.4(a)(2):

- The integrity of nonsafety-related, fluid-retaining components in safety-related areas prevents interactions that could affect safety-related SSCs; and,
- Nonsafety-related piping up to an including the first equivalent anchor beyond the safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for ATWS and EQ.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
9.6	9.3.2

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-06-1	LR 2-06-1
LR 1-06-2	**LR 2-14A-1**
LR 1-09-1	**LR 2-14A-2**
LR 1-10-1	LR 2-15-6
LR 1-11-2	LR 2-27A-2
LR 1-14A-1	--
LR 1-14A-2	--
LR 1-14A-3	--
LR 1-15-2	--
LR 1-25-1	--

Components Subject to Aging Management Review

Table 2.3.3-26 lists the component types that require aging management review and their intended functions.

Table 3.3.2-26, *Auxiliary Systems – Reactor Plant Sample System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-26
Reactor Plant Sample System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)
Demineralizer	Leakage Boundary (spatial)
Flexible hose	Leakage Boundary (spatial) Pressure Boundary
Heat exchanger	Leakage Boundary (spatial)
Piping	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)
Pump casing	Leakage Boundary (spatial)
Sample sink	Leakage Boundary (spatial)
Sight glass	Leakage Boundary (spatial)
Tank	Leakage Boundary (spatial)
Tubing	Leakage Boundary (spatial)
Valve Body	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)

2.3.3.27 Reactor Plant Vents and Drains System

System Description

The Reactor Plant Vents and Drains System is a safety-related system that is designed to collect potentially radioactive fluids and gases from various systems and discharge them to the Gaseous Waste System, the Liquid Waste Disposal System, or the Boron Recovery System.

The Reactor Plant Vents and Drains System is comprised of four subsystems, two for liquids and two for gases.

The liquids (drains) are separated into those which contain air (aerated drains) and those which contain hydrogenated reactor coolant fluid (nonaerated). Nonaerated drains are sent to the Boron Recovery System for processing and reuse. Aerated drains are sent to the Liquid Waste Disposal System for disposal.

The gases (vents) are separated into those which contain air (aerated vents) and those which contain hydrogen and radioactive gases (nonaerated vents). Aerated vents are sent to the Gaseous Waste dilution air subsystem. Nonaerated vents in which hydrogen and radioactive gases are predominant are sent to the Gaseous Waste holdup subsystem. Gases from both units are disposed of via the Unit 1 system.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides the means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97;
- Provides for the monitoring of water accumulation in the Containment sump to determine unidentified leakage from the reactor coolant pressure boundary;
- Provides a Containment isolation function;
- Provides capability for isolation of safety-related valve stem leak-off header (Unit 1 only); and,
- Contains safety-related piping that retains hydrogenated drains (Unit 2 only).

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ;
- Prevents the spread of fire by having provisions that prevent the transmittal of combustible liquids throughout the drain system (FP);
- Provides drainage of fire fighting water in rooms containing safety-related equipment (i.e., safety-related areas) (FP); and,
- Provides gas seals in the floor drains for areas protected by gas suppression systems (Unit 2 only).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 9.7	Section 9.3.3

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-06-1	LR 2-06-1
LR 1-06-2	LR 2-07-1A
LR 1-07-1	LR 2-07-3
LR 1-07-3	LR 2-08-1
LR 1-07-4	**LR 2-09-1**
LR 1-09-1	**LR 2-09-2**
LR 1-09-2	**LR 2-09-3**
LR 1-09-3	LR 2-10-1
LR 1-09-4	LR 2-15-2
LR 1-10-1	--
LR 1-14A-2	--

Components Subject to Aging Management Review

Table 2.3.3-27 lists the component types that require aging management review and their intended functions.

Table 3.3.2-27, *Auxiliary Systems – Reactor Plant Vents and Drains System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-27
Reactor Plant Vents and Drains System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Flexible hose	Leakage boundary (spatial)
Heat exchanger	Leakage boundary (spatial)
Orifice	Leakage boundary (spatial)
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Pump casing	Leakage boundary (spatial)
Strainer body	Leakage boundary (spatial)
Tank	Leakage boundary (spatial)
Trap body	Leakage boundary (spatial)
Tubing	Leakage boundary (spatial)
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.3.28 River Water System (Unit 1 only)

System Description

The River Water System includes the Reactor Plant River Water System, Auxiliary River Water System and the Turbine Plant River Water System. The River Water System provides cooling water to remove heat from the power plant auxiliary systems during all modes of operation.

The Reactor Plant River Water System consists of three safety-related river water pumps that take their suction from individual screened bays within the Intake Structure, and associated piping, valves, controls, electrical components, and instrumentation. Each pump is 100% capacity, thus providing the ability to have one pump out-of-service while still maintaining two independent trains available.

The Auxiliary River Water System is nonsafety-related and is designed to accommodate unit shutdown from 100% reactor power and subsequent cooldown of the RCS to cold shutdown conditions in the event that the Intake Structure is disabled. The system contains two pumps which take suction from individual screened bays within the Alternate Intake Structure. Either pump can deliver cooling water through a common header which then connects to the River Water System headers downstream of the Intake Structure. The Auxiliary River Water System was designed and installed as a nonsafety-related system, but is credited with mitigation of a design basis event.

The Turbine Plant River Water System is a nonsafety-related subsystem which supplies cooling water from the Ohio River to secondary systems. The system contains two pumps which take suction from individual screened bays within the Intake Structure. The pumps deliver cooling water to the turbine plant loads through a common header.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides a Containment isolation function;
- Provides means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97;
- Provides cooling water to equipment under accident and normal operating conditions (diesel generator heat exchangers, charging pump lube oil coolers, control room cooling, reactor plant component cooling water heat exchangers, and recirculation spray heat exchangers - during DBA); and,
- Provides a backup safety-related water supply for the Auxiliary Feedwater System.

10 CFR 54.4(a)(2):

- Provides a backup source of cooling water to shut down the plant and maintain it in a cold shutdown condition in the event of the loss of the Intake Structure;
- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ;
- Provides cooling water to the diesel generator heat exchangers, the charging pump lube oil coolers and the component cooling water heat exchangers (FP);
- Provides a backup safety-related water supply for the Auxiliary Feedwater System (FP);
- Provides support for running the Unit 1 Emergency Diesel Generators (SBO);
- Provides cooling water to the Unit 1 charging pump lube oil coolers (SBO); and,
- Provides cooling water to the Unit 2 Service Water System via the unit cross-tie during Unit 2 SBO.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 9.9 9.16	Not applicable

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-07-5	Not applicable
LR 1-13-2	--
LR 1-14C-1	--
LR 1-15-1	--
LR 1-20-1	--
LR 1-24-2	--
LR 1-29-2	--
LR 1-30-1	--
LR 1-30-2	--
LR 1-30-3	--
LR 1-30-4	--
LR 1-32-6	--
LR 1-36-4	--
LR 1-43-2	--
LR 1-43-3	--
LR 1-44A-2	--
LR 2-30-1	--
LR 2-30-1A	--

Components Subject to Aging Management Review

Table 2.3.3-28 lists the component types that require aging management review and their intended functions.

Table 3.3.2-28, *Auxiliary Systems – River Water System (Unit 1 only) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-28
River Water System (Unit 1 only)
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Condenser	Pressure boundary
Expansion joint	Pressure boundary
Orifice	Flow restriction Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Pump casing	Leakage boundary (spatial) Pressure boundary
Sight glass	Leakage boundary (spatial) Pressure boundary
Strainer body	Leakage boundary (spatial) Pressure boundary
Strainer element	Filtration
Tank	Leakage boundary (spatial)
Tubing	Leakage boundary (spatial) Pressure boundary
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.3.29 Security Diesel Generator System (Common)

System Description

The Security Diesel Generator System is a nonsafety-related system which provides power to exterior lighting credited by regulated events to support area access and egress by site personnel. It consists of a diesel generator, an underground fuel oil storage tank, a day tank, a fuel transfer pump and associated piping and auxiliaries. The generator is powered by a diesel engine located in the Guardhouse. The fuel oil storage tank is located underground between the Guardhouse and the Unit 1 Turbine Building. All other support equipment is located within the Guardhouse.

System Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides power to SBO and Safe Shutdown outdoor security perimeter lighting used for outdoor access/egress paths for Unit 1 and Unit 2 (FP and SBO).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
None	None

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-45F-1	None

Components Subject to Aging Management Review

Table 2.3.3-29 lists the component types that require aging management review and their intended functions.

Table 3.3.2-29, *Auxiliary Systems – Security Diesel Generator System (Common) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-29
Security Diesel Generator System (Common)
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure boundary
Filter housing	Pressure boundary
Flexible hose	Pressure boundary
Heat exchanger	Heat transfer Pressure boundary
Heater housing	Pressure Boundary
Orifice	Flow restriction Pressure boundary
Piping	Pressure boundary
Pump casing	Pressure boundary
Tank	Pressure boundary
Turbocharger housing	Pressure boundary
Valve body	Pressure boundary

2.3.3.30 Service Water System (Unit 2 only)

System Description

The Service Water System includes the Standby Service Water System. The Service Water System is a safety-related system which provides cooling water to remove heat from the power plant auxiliary systems during all modes of operation.

The Service Water System consists of three safety-related pumps and associated piping, valves, controls, electrical components, and instrumentation. Two pumps are required for normal plant operation. Only one service water pump is required for safe shutdown. The three pumps share the Intake Structure with the river water and turbine plant raw water pumps for Unit 1. Each service water pump is located in a separate bay of the Intake Structure and supplies Ohio River water to one of two supply headers.

The Standby Service Water System is designed to accommodate unit shutdown from 100% reactor power and subsequent cooldown of the RCS to cold shutdown conditions after the postulated loss of the Intake Structure. The Standby Service Water System consists of two pumps which take suction from individual screened bays within the Alternate Intake Structure, discharging to one common 30-inch line and connected to the redundant 30-inch seismic Category I Service Water supply lines via motor-operated valves located in the seismic Category I Valve Pit. The Standby Service Water System is classified nonsafety-related, but is credited with mitigation of a design basis event.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97;
- Provides a backup safety-related water supply for the Auxiliary Feedwater System and spent fuel pool;
- Provides cooling water to safety-related equipment needed under accident and normal operating conditions; and,
- Provides its own safety grade source of seal and motor cooling water to the service water pumps from connections off the main headers.

10 CFR 54.4(a)(2):

- Supplies water from the Standby Service Water System to the Service Water System whenever the Intake Structure is disabled;
- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ;

- Supplies cooling water to the component cooling water heat exchangers, diesel generator coolers, charging pump lube oil coolers and various heating, ventilating and air-conditioning cooling coils (FP);
- Provides a backup safety-related water supply for the Auxiliary Feedwater System and spent fuel pool (FP);
- Provides support for running the Unit 2 Emergency Diesel Generators (SBO); and,
- Provides a cooling water flow path for the Unit 2 Charging Pumps (from the Unit 1 River Water System via the unit cross tie) during a Unit 2 SBO.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Not applicable	Sections 9.2.1.1 9.2.1.2

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
Not applicable	LR 1-30-1
--	LR 2-07-1A
--	LR 2-07-5
--	LR 2-13-1
--	LR 2-14C-1
--	LR 2-15-1
--	LR 2-24-3
--	LR 2-29-4
--	**LR 2-30-1**
--	**LR 2-30-1A**
--	**LR 2-30-2**
--	**LR 2-30-3**

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
--	LR 2-36-4A
--	LR 2-36-4B
--	LR 2-43-22
--	LR 2-44A-2
--	LR 2-44A-3
--	LR 2-44B-1
--	LR 2-44B-3

Components Subject to Aging Management Review

Table 2.3.3-30 lists the component types that require aging management review and their intended functions.

Table 3.3.2-30, *Auxiliary Systems – Service Water System (Unit 2 only) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-30
Service Water System (Unit 2 only)
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural support (attached)
Expansion joint	Pressure boundary
Flexible Hose	Pressure boundary
Orifice	Flow restriction Leakage boundary (spatial) Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary Structural support (attached)

Table 2.3.3-30
Service Water System (Unit 2 only)
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Pump casing	Leakage boundary (spatial) Pressure boundary
Sight glass	Pressure boundary
Strainer body	Pressure boundary
Strainer element	Filtration
Tank	Leakage boundary (spatial)
Tubing	Leakage boundary (spatial) Pressure boundary
Valve body	Leakage boundary (spatial) Pressure boundary Structural support (attached)

2.3.3.31 Solid Waste Disposal System

System Description

The primary purpose of the Solid Waste Disposal System is to provide facilities for the collection and preparation of radioactive waste materials for shipment to processing and disposal facilities. Portions of the Unit 2 system provide a safety-related piping pressure boundary for the Chemical and Volume Control System, but the Solid Waste Disposal System is not credited with any other safety-related or regulated event function.

The various waste streams are prepared for shipment by filtration, dewatering, solidification, segregation, compaction, packaging, and/or storage. The materials which are handled as radioactive solid waste include depleted resins from process ion exchangers, concentrated waste solutions from the evaporator bottoms hold tanks, spent filter cartridges, and miscellaneous contaminated or irradiated solid materials (other than fuel). The filling of containers, storage and shipment of radioactive solid wastes conform with NRC and U.S. Department of Transportation regulations.

The Solid Waste Disposal System immobilizes radioactive wastes in a cement mixture inside 55-gallon closed head steel drums. This method has a low probability of accidental release of radioactive material to the environment during transport and storage. The waste solidification system consists of a cement storage bin and cement feeder, resin waste hold tank, evaporator bottoms hold tank, caustic buffering equipment, drumming station and drum processing enclosure, and necessary pumps, piping, valves, instrumentation, electronics, and other hardware for the system to function.

The system also has provisions for the disposal of compressible solid waste generated during station operation and maintenance. Compressible solid waste consists of items such as rags, anti-contamination clothing, and plastic bags. The solid waste baler is a hydraulically operated ram that compresses the material into 55-gallon drums for eventual shipment offsite.

System Intended Functions

10 CFR 54.4(a)(1):

- System includes safety-related piping that retains fluid from the Chemical Volume Control System (Unit 2 only).

10 CFR 54.4(a)(2):

- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs; and,
- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs (Unit 2 only).

10 CFR 54.4(a)(3): None

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 11.2.5	Section 11.4

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-07-2	LR 2-07-1B
LR 1-08-2	LR 2-08-2
LR 1-08-5	**LR 2-18-1**
LR 1-17-2	LR 2-20-1
LR 1-18-1	--
LR 1-18-2	--
LR 1-18-3	--
LR 1-20-1	--

Components Subject to Aging Management Review

Table 2.3.3-31 lists the component types that require aging management review and their intended functions.

Table 3.3.2-31, *Auxiliary Systems – Solid Waste Disposal System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-31
Solid Waste Disposal System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Filter housing	Leakage boundary (spatial)
Flexible hose	Leakage boundary (spatial)
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

Table 2.3.3-31
Solid Waste Disposal System
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Pump casing	Leakage boundary (spatial)
Sight glass	Leakage boundary (spatial)
Tank	Leakage boundary (spatial)
Tubing	Leakage boundary (spatial)
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.3.32 Supplementary Leak Collection and Release System

System Description

The Supplementary Leak Collection and Release System is a safety-related system whose purpose is to ensure that radioactive leakage from the primary Containment following the occurrence of a design basis accident is collected and filtered for iodine removal prior to discharge to the atmosphere at the system vent located on top of the Containment Building dome (elevated release). Note that filtering of radioactive material from the ventilation stream still occurs, but is no longer credited in BVPS accident analyses. The system also provides temperature control by the removal of heat from areas where equipment important to safety is located. Following a loss of offsite power, the Supplementary Leak Collection and Release System fans can be powered from the emergency buses to ensure the components in these areas do not exceed their design temperatures.

The Supplementary Leak Collection and Release System consists of fans, ductwork, dampers, high-efficiency particulate activity filters, charcoal filters, and the associated I&C. The system fans operate during normal plant operation to exhaust the various areas. The system automatically transfers ventilation flow through the filter bank on a Containment isolation signal or a high-high radiation signal from monitors in the ventilation exhaust. The capacity of each exhaust fan is in excess of the estimated air in-leakage to the Containment contiguous area and other areas served. The excess capacity of the fan ensures a negative pressure in the areas being exhausted.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides the means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97;
- Provides for heat removal from areas containing safety-related equipment in order to maintain indoor temperatures below design limits;
- Maintains negative pressure in areas exhausted; and,
- Provides Containment isolation function (Unit 1 only).

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs (Unit 2 only).

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ;
- System fire dampers are provided in order to prevent the spread of fire through the ductwork (FP);
- Prevents area temperature rise to preclude the loss of equipment via use of portable fans for the charging pump cubicles (FP) (Unit 1 only); and,
- Provides ventilation to the charging pump cubicles to prevent area temperature rise to preclude the loss of equipment (FP) (Unit 1 only).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 6.6	Section 6.5.3.2

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-12-1	**LR 2-16-1**
LR 1-16-1	**LR 2-16-2**
LR 1-33-3	LR 2-26-3
LR 1-34-5	LR 2-33-2A
LR 1-34-8	LR 2-44C-2
--	LR 2-44D-2

Components Subject to Aging Management Review

Table 2.3.3-32 lists the component types that require aging management review and their intended functions.

Table 3.3.2-32, *Auxiliary Systems – Supplementary Leak Collection and Release System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.3-32
Supplementary Leak Collection and Release System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Damper housing	Pressure boundary Structural integrity (attached)
Duct	Pressure boundary Structural integrity (attached)
Fan housing	Pressure boundary
Filter housing	Pressure boundary

Table 2.3.3-32
Supplementary Leak Collection and Release System
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Flexible connection	Pressure boundary
Flow straightener	Pressure boundary
Heater housing	Pressure boundary
Isokinetic nozzle	Pressure boundary
Moisture separator	Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Tank	Leakage boundary (spatial) Pressure boundary
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.4 STEAM AND POWER CONVERSION SYSTEMS

The following systems are included in this section.

- Auxiliary Feedwater System (Section 2.3.4.1)
- Auxiliary Steam System (Section 2.3.4.2)
- Building Services Hot Water Heating System (Section 2.3.4.3)
- Condensate System (Unit 1 only) (Section 2.3.4.4)
- Glycol Heating System (Unit 1 only) (Section 2.3.4.5)
- Main Feedwater System (Section 2.3.4.6)
- Main Steam System (Section 2.3.4.7)
- Main Turbine and Condenser System (Section 2.3.4.8)
- Steam Generator Blowdown System (Section 2.3.4.9)
- Water Treatment System (Section 2.3.4.10)

2.3.4.1 Auxiliary Feedwater System

System Description

The Auxiliary Feedwater System is a safety-related system that provides an emergency source of feedwater to the steam generators. The system is required to ensure safe shutdown in the event of a main turbine trip with complete loss of normal electric power to the station, and is automatically started on a safety injection signal. The Auxiliary Feedwater System (Unit 1 only) also includes a nonsafety-related dedicated auxiliary feedwater pump.

The Auxiliary Feedwater System at each unit consists of two motor-driven auxiliary feed pumps, a turbine-driven auxiliary feed pump, and the associated piping, valves, controls, electrical components, and instrumentation. The auxiliary feed pumps normally take suction from the primary plant demineralized water storage tank. The Auxiliary Feedwater System can also be supplied with water from the River Water System (Unit 1 only) / Service Water System (Unit 2 only). The motor-driven auxiliary feedwater pumps receive power from redundant 4,160 VAC emergency switchgear. The turbine-driven auxiliary feed pump is supplied with steam from the main steam lines upstream of the steam line isolation valves.

A significant difference exists between the Unit 1 and Unit 2 Auxiliary Feedwater Systems. The Unit 1 motor-driven auxiliary feedwater pumps and the turbine-driven pump are all located in the same area. The assumption is made that all three pumps could be damaged by a postulated fire in this area. For this reason, a remotely-located, nonsafety-related, dedicated motor-driven auxiliary feedwater pump was installed at Unit 1 to provide shutdown capability in the event of a fire in the auxiliary feedwater pump area. This additional pump is capable of taking suction from either of two tanks that are evaluated in the Condensate System. The dedicated auxiliary feedwater pump motor is powered from the Emergency Response Facility Substation, which can be powered by the ERFS Diesel Generator. Unit 2 does not have a corresponding pump because the Unit 2 auxiliary feedwater pumps are not all housed in a common fire area.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides condensate inventory and supplies condensate to the steam generators to remove sensible and core decay heat;
- Provides the means for assessing plant conditions during and following an accident;
- Provides a Containment isolation function;
- Provides sufficient redundancy to ensure the required flow to a minimum of two steam generators while subjected to a single failure;
- Provides a secondary safety-related water supply to the auxiliary feedwater pumps from the River Water System (Unit 1 only) / Service Water System (Unit 2 only); and,
- Provides the means to prevent a loss of auxiliary feedwater in the event of an auxiliary feedwater header rupture (Unit 2 only).

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Provides auxiliary feedwater to the steam generators using two motor-driven and one steam turbine-driven pump upon ATWS Mitigation System Actuation Circuitry (AMSAC) actuation (ATWS);
- Provides an auxiliary feedwater pump high discharge pressure signal to the Steam Generator Blowdown and Reactor Plant Sampling Systems (ATWS) (Unit 1 only);
- Provides valve isolation logic signals to the Steam Generator Blowdown and Reactor Plant Sampling Systems (ATWS) (Unit 2 only);

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ;
- Provides condensate inventory and supplies condensate to the steam generators to remove sensible and core decay heat (FP);
- Provides an alternate shutdown subsystem for the Auxiliary Feedwater System via the dedicated auxiliary feedwater pump for delivery of cooling water to the steam generators to remove both sensible and decay heat (FP) (Unit 1 only);
- Provides the steam generators with water for achieving cold shutdown conditions (FP) (Unit 1 only);
- Provides indication of flow from the auxiliary feedwater turbine-driven feedwater pump to the steam generators (SBO); and,
- Provides condensate inventory and supplies condensate to the steam generators to remove sensible and core decay heat (SBO).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 10.3.5.1.2 10.3.5.2.2 10.3.5.2.3	Section 10.4.9

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-24-1	**LR 2-24-3**
LR 1-24-2	**LR 2-24-5**
LR 1-24-3	--
LR 1-32-7	--

Components Subject to Aging Management Review

Table 2.3.4-1 lists the component types that require aging management review and their intended functions.

Table 3.4.2-1, *Steam and Power Conversion Systems – Auxiliary Feedwater System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.4-1
Auxiliary Feedwater System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Flexible Hose	Pressure boundary
Heat Exchanger	Heat transfer Pressure boundary
Orifice	Flow restriction Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Pump Casing	Leakage boundary (spatial) Pressure boundary
Sight glass	Pressure boundary
Strainer Body	Pressure boundary
Tank	Leakage boundary (spatial) Pressure boundary
Tubing	Pressure boundary
Valve Body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.4.2 Auxiliary Steam System

System Description

The Auxiliary Steam System supplies heating and process steam for nonsafety-related use in various balance-of-plant and primary plant support systems, and recovers the condensed steam from the equipment served. The system is capable of providing steam during normal operation, plant start-up, and plant shutdown.

The Auxiliary Steam System receives its steam supply from the Main Steam System (when the reactor plant is in operation), from the opposite unit's Auxiliary Steam System (when the supplied unit is shutdown) or from the Unit 2 Auxiliary Boilers. Unit 1 does not have auxiliary boilers. A condensate receiver and condensate pumps are used to collect condensate from the components served. The condensate collected may be returned to either unit. Auxiliary steam condensate is continuously monitored for radioactivity to ensure that leakage from radioactive systems into the Auxiliary Steam System is detected.

The only equipment in the Auxiliary Steam System that performs a safety-related function are the safety-related Auxiliary Steam System isolation valves, which automatically isolate on a HELB in selected areas.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides automatic isolation of the auxiliary steam supply.

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 10.3.2	Section 10.4.10

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-07-3	LR 2-07-2
LR 1-08-1	LR 2-08-1
LR 1-08-3	LR 2-15-6
LR 1-08-5	**LR 2-27A-1**
LR 1-17-2	**LR 2-27A-2**
LR 1-27-1	**LR 2-27A-3**
LR 1-27-2	--
LR 1-27-4	--
LR 1-43-2	--

Components Subject to Aging Management Review

Table 2.3.4-2 lists the component types that require aging management review and their intended functions.

Table 3.4.2-2, *Steam and Power Conversion Systems – Auxiliary Steam System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.4-2
Auxiliary Steam System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Flexible hose	Leakage boundary (spatial)
Heat exchanger	Leakage boundary (spatial)
Orifice	Leakage boundary (spatial)
Piping	Leakage boundary (spatial) Structural integrity (attached)
Pump casing	Leakage boundary (spatial)
Sight glass	Leakage boundary (spatial)
Strainer body	Leakage boundary (spatial)
Tank	Leakage boundary (spatial)
Trap body	Leakage boundary (spatial)
Tubing	Leakage boundary (spatial)
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.4.3 Building Services Hot Water Heating System

System Description

The Building Services Hot Water Heating System is a nonsafety-related system which supplies chemically-treated hot water to various unit heaters and heating coils in air handling units and ductwork. In addition, at Unit 1, the system supplies the Glycol Heating System heat exchangers. The Building Services Hot Water Heating System is not credited for any safety-related function or regulated event.

The Building Services Hot Water Heating System consists of pumps, heat exchangers, and associated piping, tanks, valves, controls, electrical components, and instrumentation. The hot water heating piping system consists of several branches, some of which supply areas containing safety-related equipment.

System Intended Functions

10 CFR 54.4(a)(1): None.

10 CFR 54.4(a)(2):

- The integrity of nonsafety-related, fluid-retaining components in safety-related areas prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3): None.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
None	None

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-41A-1	**LR 2-41A-1**
LR 1-41A-2	**LR 2-41A-2**
LR 1-41A-3	**LR 2-41A-3**
LR 1-41B-1	**LR 2-41A-4**
--	LR 2-44B-1
--	LR 2-44B-2
--	LR 2-44B-3
--	LR 2-44D-1

Components Subject to Aging Management Review

Table 2.3.4-3 lists the component types that require aging management review and their intended functions.

Table 3.4.2-3, *Steam and Power Conversion Systems – Building Services Hot Water Heating System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.4-3
Building Services Hot Water Heating System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial)
Heat exchanger	Leakage boundary (spatial)
Heating coil	Leakage boundary (spatial)
Orifice	Leakage boundary (spatial)
Piping	Leakage boundary (spatial)
Pump casing	Leakage boundary (spatial)
Sight glass	Leakage boundary (spatial)
Strainer body	Leakage boundary (spatial)
Tank	Leakage boundary (spatial)
Trap body	Leakage boundary (spatial)
Tubing	Leakage boundary (spatial)
Valve body	Leakage boundary (spatial)

2.3.4.4 Condensate System (Unit 1 only)

System Description

The Condensate System is a nonsafety-related system that removes condensate from the main condenser hotwell and provides preheated water to the suction of the main feedwater pumps. The system provides cooling for the steam generator blowdown heat exchanger, condenser air ejectors, and gland steam condensers. From the gland steam condensers, condensate flows through two parallel trains of feedwater heaters. The feedwater heater trains each consist of one heater drain cooler and five low pressure feedwater heaters. The flow from the last low pressure feedwater heater combines with the other train to the common suction line of the main feedwater pumps.

The Condensate System is within the scope of license renewal only for its support of the nonsafety-related dedicated auxiliary feedwater pump. The Condensate System supplies water to the dedicated auxiliary feedwater pump from plant demineralized water storage tanks. The Unit 1 motor-driven auxiliary feedwater pumps and the turbine-driven pump are located in the same area. The assumption is made that all three pumps could be damaged by a postulated fire in this area. For this reason, a remotely-located, dedicated motor-driven auxiliary feed pump was installed at Unit 1 to provide shutdown capability in the event of a postulated fire in the auxiliary feedwater pump area. Unit 2 does not have a corresponding pump because the Unit 2 auxiliary feedwater pumps are not all housed in a common fire area.

System Intended Functions

10 CFR 54.4(a)(1): None.

10 CFR 54.4(a)(2): None.

10 CFR 54.4(a)(3):

- Provides condensate inventory to the dedicated auxiliary feedwater pump for decay heat removal (FP).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 10.3.5	Not applicable

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-22-1	Not applicable

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-24-3	--
LR 1-32-7	--

Components Subject to Aging Management Review

Table 2.3.4-4 lists the component types that require aging management review and their intended functions.

Table 3.4.2-4, *Steam and Power Conversion Systems – Condensate System (Unit 1 only) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.4-4
Condensate System (Unit 1 only)
Components Subject to Aging Management Review

Component Type	Intended Function(s)
Bolting	Pressure Boundary
Piping	Pressure Boundary
Tank	Pressure Boundary
Valve body	Pressure Boundary

2.3.4.5 Glycol Heating System (Unit 1 only)

System Description

The Unit 1 Glycol Heating System is a nonsafety-related building services system that supplies heating solution to ventilation and air conditioning units that use outside air.

The Glycol Heating System is a closed, forced system consisting of heat exchangers, circulating pumps, piping, valves and heating coils. An aqueous solution of ethylene glycol is circulated through preheat coils and heating coils to prevent coil freeze-up of heating and ventilating units and air conditioning units utilizing outdoor air.

The glycol solution piping consists of two piping loops; one loop supplies selected heating coils in the Auxiliary Building and the other supplies selected heating coils in the Service Building.

System Intended Functions

10 CFR 54.4(a)(1): None.

10 CFR 54.4(a)(2):

- The integrity of nonsafety-related, fluid-retaining components in safety-related areas prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3): None.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
None	Not applicable

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-41B-1	Not applicable

Components Subject to Aging Management Review

Table 2.3.4-5 lists the component types that require aging management review and their intended functions.

Table 3.4.2-5, *Steam and Power Conversion Systems – Glycol Heating System (Unit 1 only) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.4-5
Glycol Heating System (Unit 1 only)
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial)
Heat exchanger	Leakage boundary (spatial)
Heating coil	Leakage boundary (spatial)
Orifice	Leakage boundary (spatial)
Piping	Leakage boundary (spatial)
Pump casing	Leakage boundary (spatial)
Sight glass	Leakage boundary (spatial)
Strainer body	Leakage boundary (spatial)
Tank	Leakage boundary (spatial)
Tubing	Leakage boundary (spatial)
Valve body	Leakage boundary (spatial)

2.3.4.6 Main Feedwater System

System Description

The purpose of the Main Feedwater System is to supply feedwater to the three steam generators. The system uses two half-size motor-driven main feedwater pumps to provide the necessary flow and pressure. Unit 2 also has a motor-driven start-up feedwater pump that is used to minimize operation of the main feedwater pumps at low flow during start-up and low load operation (Unit 2 only). The start-up feedwater pump can be operated in parallel with one main feedwater pump if the other main feedwater pump is out of service (Unit 2 only).

The main feedwater pumps discharge through two half-size high pressure feedwater heaters arranged in parallel to a common discharge header for distribution to the steam generators. Feedwater flows to each steam generator through individual feedwater flow control valves. Each valve is positioned by a three-element feedwater control system. When feedwater flow requirements are low, a bypass valve around each feedwater control valve provides steam generator level and feedwater flow control.

The feedwater isolation valves, control valves, and control valve bypass valves automatically close on receipt of a feedwater isolation signal to isolate main feedwater flow to the steam generators.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides the means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97;
- Automatically isolates feedwater upon generation of a feedwater isolation signal;
- Provides inputs to the Solid State Protection System;
- Provides a Containment isolation function; and,
- Provides a flowpath for the Auxiliary Feedwater System to inject makeup water into the Steam Generators.

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Provides a flowpath for the Auxiliary Feedwater System to inject makeup water into the Steam Generators (FP);
- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ;
- Provides loss of feedwater flow signal to AMSAC using feedwater flow transmitters (ATWS);
- Provides a flowpath for the Auxiliary Feedwater System to inject makeup water into the Steam Generators (SBO); and,
- Provides Steam Generator wide range and narrow range level indication (SBO).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 10.3.5	Section 10.4.7

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-24-1	LR 2-21-1
LR 1-24-3	**LR 2-24-2A**
--	**LR 2-24-3**

Components Subject to Aging Management Review

Table 2.3.4-6 lists the component types that require aging management review and their intended functions.

Table 3.4.2-6, *Steam and Power Conversion Systems – Main Feedwater System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.4-6
Main Feedwater System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Flexible Hose	Leakage boundary (spatial) Pressure boundary
Orifice	Flow restriction Leakage boundary (spatial) Pressure boundary

Table 2.3.4-6
Main Feedwater System
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Tubing	Leakage boundary (spatial) Pressure boundary
Valve Body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.4.7 Main Steam System

System Description

The purpose of the Main Steam System is to supply dry saturated steam to the Main Turbine, the Turbine Steam Bypass System, the Gland Sealing System, the Auxiliary Steam System, the moisture separator reheaters, and the turbine-driven auxiliary feedwater pump. Portions of the Main Steam System are safety-related and provide for reactor decay heat removal and reactor plant cooldown.

Steam from each of the three steam generators is routed through the Containment wall to the main steam valve area, which houses the steam generator safety valves, main steam trip and non-return valves (Unit 1 only) / main steam isolation valves (Unit 2 only), atmospheric steam dump valves and a single common residual heat release valve. Each main steam line in the main steam valve area also supplies the turbine-driven auxiliary feedwater pump. The three main steam lines join a main steam header in the Turbine Building, just below the mezzanine level.

Bypass valves are provided around each main steam trip valve (Unit 1 only) / main steam isolation valve (Unit 2 only). These bypass valves are normally closed during power operation. The valves are used during plant heat-up to assist in warming up and pressurizing the downstream main steam piping.

The main steam header distributes steam to systems in the Turbine Building: four lines go to the high pressure turbine throttle valves; two lines go to the turbine steam bypass (steam dump) system; and individual lines supply the Gland Sealing and Auxiliary Steam Systems. Two reheater steam supply lines tap off the two steam dump lines.

An atmospheric steam dump valve is installed on each main steam line upstream of each main steam trip and non-return valve (Unit 1 only) / main steam isolation valve (Unit 2 only). The three atmospheric steam dump valves provide plant cooldown capability when the main condenser is unavailable. They also relieve excess pressure in the steam generators, and can prevent unwanted lifting of the safety valves.

The residual heat release valve is sized to remove all sensible and core decay heat one-half hour after a reactor trip when the main condenser is not available. The steam flow is from the valve, through the residual heat release header, to atmosphere. This one valve, which is mounted on the common residual heat release header, serves all three steam generators through connections on each main steam line upstream of the main steam trip valves (Unit 1 only) / main steam isolation valves (Unit 2 only). There is a check valve in each residual heat release line to ensure that steam may flow to the header, but prevent reverse flow if a line breaks between a steam generator and a main steam trip valve (Unit 1 only) / main steam isolation valve (Unit 2 only).

The Condenser Steam Dump System is comprised of 18 valves capable of dumping steam to the condenser as necessary. The valves are configured such that 9 valves dump to each condenser half. Upon loss of load to the Main Turbine Generator, the Steam Dump System automatically bypasses excess steam from the steam generators directly to the main condenser and controls the amount of flow through the steam dumps based on reactor coolant average temperature. The Steam Dump System is also used during plant startup, testing, and shutdown to maintain constant steam pressure in the main steam header.

A flow restrictor in each steam generator exit nozzle limits steam flow in the event of a steam line break downstream of the flow restrictor, thereby limiting the RCS cooldown rate and reactivity addition to the reactor core.

System Intended Functions

10 CFR 54.4(a)(1):

- Provides secondary isolation of a ruptured steam generator;
- Provides the means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97 (Unit 1 only);
- Provides support for the cooldown of the RCS and depressurization of the secondary plant when the main condenser is unavailable;
- Provides relief from steam generator over-pressurization;

- Automatically isolates main steam flow from the steam generators to prevent the blowdown of all three steam generators due to a steam line break in any one steam generator or its associated piping;
- Contains instrumentation channels that provide inputs to the Solid State Protection System;
- Provides a Containment isolation function; and,
- Provides a supply of steam for the turbine-driven auxiliary feedwater pump.

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Provides turbine load input signal (turbine impulse pressure) to AMSAC (ATWS);
- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ;
- Cools the Reactor Core via the RCS by removing decay heat using steam from the Steam Generators through the safety valves, atmospheric steam dump valves, and the residual heat release valve (FP and SBO);
- Provides a supply of steam for the turbine-driven auxiliary feedwater pump (FP and SBO);
- Supports cold shutdown by removing decay and sensible heat from the RCS via heat transfer to cooling water on the secondary side of the steam generators, achieved by going solid and draining to the main condenser via the steam bypass dump valves (FP) (Unit 1 only); and,
- Main steam line code safety valves provide relief from Steam Generator over-pressurization (FP) (Unit 2 only).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 10.3.1.2	Section 10.3.2

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-21-1	**LR 2-21-1**
LR 1-21-2	**LR 2-21-2**
LR 1-21-3	**LR 2-21-3**
LR 1-21-4	LR 2-24-5
LR 1-26-4	LR 2-26-1

Components Subject to Aging Management Review

Table 2.3.4-7 lists the component types that require aging management review and their intended functions.

Table 3.4.2-7, *Steam and Power Conversion Systems – Main Steam System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.4-7
Main Steam System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Flexible Hose	Leakage boundary (spatial) Pressure boundary
Orifice	Flow restriction Leakage boundary (spatial) Pressure boundary
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Trap Body	Leakage boundary (spatial)

Table 2.3.4-7
Main Steam System
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Tubing	Leakage boundary (spatial) Pressure boundary
Turbine Casing	Pressure boundary
Valve Body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.4.8 Main Turbine and Condenser System

System Description

The Main Turbine and Condenser System and associated auxiliaries utilize steam from the nuclear steam supply system to provide the motive force for the Main Unit Generator, which generates electrical power for use on the system grid. The Main Turbine portion of the system consists of an 1,800 rpm tandem compound main turbine unit, consisting of one double-flow high pressure turbine and two double-flow low pressure turbine sections, four high pressure inlet throttle valves, four high pressure inlet governing valves, four moisture separator reheaters, four low pressure reheat stop valves, four low pressure interceptor valves, an electro-hydraulic control system, provisions for extracting steam for feedwater heating, a gland steam sealing system, and a turbine lube oil and associated auto-stop oil system. Other portions of the Main Turbine and Condenser System include the main condenser and air ejectors, and the miscellaneous vents and drain system.

Steam from the Main Steam System is admitted to the turbine system through four steam lines, each of which has a throttle valve. The steam is then supplied through individually controlled, hydraulically-operated governor valves to the high pressure turbine. Steam passes from the high pressure turbine casing into the moisture separator reheaters. High pressure steam from the main steam header is the heating steam in the moisture separator reheaters. Dry superheated steam (at full load) exits the moisture separator reheaters through reheat stop valves and intercept valves, and enters the two low pressure turbines. Steam passes from the two low pressure turbines to the condenser.

To prevent the leakage of air into or steam out of the turbine casing along the shaft, each turbine section is equipped with labyrinth-type steam gland seals that are supplied with steam from the gland sealing steam system.

The turbine shaft is supported by journal bearings, two for each turbine. Axial positioning of the shaft is accomplished by use of a thrust bearing mounted between the two low pressure turbines. The turbine bearings are supplied with oil from the turbine lubricating oil system. The oil output of this system is used to cool and lubricate the turbine bearings, and as a control medium in the turbine protection (auto stop oil) system to effect various turbine trips. The output of this system is also relied upon as a backup for the generator seal oil system upon failure of both air side seal oil pumps.

The auto stop oil system is a hydraulic system which initiates a turbine trip when required. The auto stop oil system trip signal causes a loss of electro-hydraulic fluid system pressure and closure of all turbine throttle, governor, interceptor and reheat stop valves.

The Unit 1 air ejector exhaust is diverted from the Gaseous Waste System to the reactor Containment upon receipt of a signal from an in-line radiation monitor. This line provides a Containment isolation function (Unit 1 only).

System Intended Functions

10 CFR 54.4(a)(1):

- Provides means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97; and,
- Provides Containment isolation function (Unit 1 only).

10 CFR 54.4(a)(2):

- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs; and,
- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs (Unit 1 only).

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ; and,
- Trips turbine upon AMSAC actuation (ATWS).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 10.3.3 10.3.6 10.3.7 10.3.8	Sections 10.2 10.4.1 10.4.2 10.4.3

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-26-6	**LR 2-26-3**

Components Subject to Aging Management Review

Table 2.3.4-8 lists the component types that require aging management review and their intended functions.

Table 3.4.2-8, *Steam and Power Conversion Systems – Main Turbine and Condenser System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.4-8
Main Turbine and Condenser System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Moisture Separator	Leakage boundary (spatial)

**Table 2.3.4-8
Main Turbine and Condenser System
Components Subject to Aging Management Review
(continued)**

Component Type	Intended Function
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Trap Body	Leakage boundary (spatial)
Valve Bodies	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.4.9 Steam Generator Blowdown System

System Description

The primary purpose of the Steam Generator Blowdown System is to remove contaminants and process blowdown water from the steam generators to maintain steam generator water chemistry within specified limits. Continuous blowdown of the steam generators is necessary during operation because the boiling action concentrates the chemicals and impurities introduced into the steam generators from the feedwater. Portions of the system are safety-related.

The Steam Generator Blowdown System includes Containment isolation valves, a blowdown flash tank, and the associated tanks, pumps, piping, heat exchangers, filters, demineralizers, resin traps, valves, and instrumentation.

The blowdown flowrate is regulated by adjusting hand control valves. Steam in the blowdown flash tank is normally directed to feedwater heaters. Blowdown flash tank level is controlled by a level control valve. The blowdown water flows through heat exchangers, filters, and demineralizers prior to returning to the main condenser. Radiation monitors continuously sample the flowpath to provide indication of a potential steam generator tube leak.

Safety-related Containment isolation valves perform a Containment isolation function, and function to isolate steam generator blowdown flow in the event of a HELB outside Containment or actuation of the auxiliary feedwater pumps. Additionally, high steam generator sample radiation or high level in the blowdown tank will isolate blowdown flow (Unit 2 only).

System Intended Functions

10 CFR 54.4(a)(1):

- Provides automatic isolation of the blowdown lines in the event of a HELB outside of the Containment;
- Provides means for assessing plant conditions during and following an accident in support of NRC Regulatory Guide 1.97; and,
- Provides a Containment isolation function.

10 CFR 54.4(a)(2):

- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs; and,
- The integrity of nonsafety-related, fluid-retaining components in safety-related area(s) prevents interactions that could affect safety-related SSCs.

10 CFR 54.4(a)(3):

- Contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with regulations for EQ; and,
- Provides isolation of the steam generator blowdown lines upon Auxiliary Feedwater System actuation (ATWS).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 10.3.8	Section 10.4.8

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-25-1	LR 2-14A-1
LR 1-43-2	LR 2-15-5

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
--	LR 2-25-1
--	LR 2-25-2
--	LR 2-25-4
--	LR 2-25-5

Components Subject to Aging Management Review

Table 2.3.4-9 lists the component types that require aging management review and their intended functions.

Table 3.4.2-9, *Steam and Power Conversion Systems – Steam Generator Blowdown System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.4-9
Steam Generator Blowdown System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Filter housing	Leakage boundary (spatial)
Flexible hose	Leakage boundary (spatial)
Heat exchanger	Leakage boundary (spatial)
Orifice	Leakage boundary (spatial)
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Pump casing	Leakage boundary (spatial)
Tank	Leakage boundary (spatial)

Table 2.3.4-9
Steam Generator Blowdown System
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Tubing	Leakage boundary (spatial)
Valve body	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)

2.3.4.10 Water Treatment System

System Description

The Water Treatment System is a nonsafety-related system that is designed to:

- Clarify and filter Ohio River water;
- Demineralize a portion of the filtered water;
- Produce reactor-grade demineralized water;
- Provide sufficient storage of filtered and demineralized water; and,
- Neutralize wastes to produce an effluent having a pH of 6.0 to 9.0 before discharge to the cooling tower blowdown stream.

The main water treatment processing facility is located at Unit 1, where river water is clarified, filtered, and demineralized. The normal method of producing demineralized water is by pumping filtered water through a vendor-supplied demineralizer skid. Installed demineralizers and regeneration equipment exist in the water treatment area, but are not normally used.

The filtered and demineralized water is then distributed from the Unit 1 processing facility to Unit 1 and Unit 2. The most significant recipient of demineralized water is the primary plant demineralized water storage tank, which supplies the auxiliary feedwater pumps. The water treating systems at both units contain the tanks, pumps, and associated piping, valves, controls, and instrumentation to store, distribute, and chemically adjust demineralized and filtered water as required for primary and secondary plant make-up, cooling water make-up and for general plant use. Operation of the water supply and treatment system is not necessary for safety, therefore redundancy of all equipment has not been provided.

System Intended Functions

10 CFR 54.4(a)(1): None.

10 CFR 54.4(a)(2):

- The integrity of nonsafety-related, fluid-retaining components in safety-related areas prevents interactions that could affect safety-related SSCs; and,
- Nonsafety-related piping up to and including the first equivalent anchor beyond safety/nonsafety interface(s) may provide mechanical support for safety-related SSCs (Unit 2 only).

10 CFR 54.4(a)(3):

- Demineralized water storage tank provides gravity feed makeup to the primary plant demineralized water storage tank to support safe shutdown (FP) (Unit 2 only).

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 9.11	Section 9.2.3

License Renewal Drawings

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

BVPS Unit 1 License Renewal Drawings	BVPS Unit 2 License Renewal Drawings
LR 1-32-2	LR 2-24-3
LR 1-32-8	LR 2-30-3
LR 1-32-9	**LR 2-32-1**
--	**LR 2-32-2**
--	LR 2-36-4A
--	LR 2-36-4B
--	LR 2-43-22

Components Subject to Aging Management Review

Table 2.3.4-10 lists the component types that require aging management review and their intended functions.

Table 3.4.2-10, *Steam and Power Conversion Systems – Water Treatment System – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.3.4-10
Water Treatment System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Piping	Leakage boundary (spatial) Pressure boundary Structural integrity (attached)
Sight glass	Leakage boundary (spatial)
Tank	Leakage boundary (spatial) Pressure boundary
Tubing	Leakage boundary (spatial)
Valve body	Leakage boundary (spatial) Structural integrity (attached)

2.4 SCOPING AND SCREENING RESULTS: STRUCTURES

The following structures are included in this section.

- Alternate Intake Structure (Common) (Section 2.4.1)
- Auxiliary Building (Section 2.4.2)
- Boric Acid Tank Building (Unit 1 only) (Section 2.4.3)
- Cable Tunnel (Section 2.4.4)
- Chemical Addition Building (Unit 1 only) (Section 2.4.5)
- Condensate Polishing Building (Unit 2 only) (Section 2.4.6)
- Control Building (Unit 2 only) (Section 2.4.7)
- Decontamination Building (Section 2.4.8)
- Diesel Generator Building (Section 2.4.9)
- Emergency Outfall Structure (Unit 2 only) (Section 2.4.10)
- Emergency Response Facility Diesel Generator Building (Common) (Section 2.4.11)
- Emergency Response Facility Substation Building (Common) (Section 2.4.12)
- Equipment Hatch Platform (Section 2.4.13)
- Fuel Building (Section 2.4.14)
- Gaseous Waste Storage Vault (Section 2.4.15)
- Guard House (Common) (Section 2.4.16)
- Intake Structure (Common) (Section 2.4.17)
- Main Steam and Cable Vault (Section 2.4.18)
- Pipe Tunnel (Section 2.4.19)
- Primary Demineralized Water Storage Tank Pad and Enclosure (Section 2.4.20)
- Primary Water Storage Building (Unit 1 only) (Section 2.4.21)
- Reactor Containment Building (Section 2.4.22)
- Refueling Water Storage Tank and Chemical Addition Tank Pad and Surroundings (Section 2.4.23)
- Relay Building (Common) (Section 2.4.24)
- Safeguards Building (Section 2.4.25)
- Service Building (Section 2.4.26)
- Solid Waste Building (Unit 1 only) (Section 2.4.27)
- South Office and Shops Building (Common) (Section 2.4.28)
- Steam Generator Drain Tank Structure (Unit 1 only) (Section 2.4.29)

- Switchyard (Common) (Section 2.4.30)
- Turbine Building (Section 2.4.31)
- Valve Pit (Section 2.4.32)
- Waste Handling Building (Unit 2 only) (Section 2.4.33)
- Water Treatment Building (Unit 1 only) (Section 2.4.34)
- Yard Structures (Section 2.4.35)

Structural commodities (e.g., anchorages, embedments, instrument racks, cable trays, conduits, fire doors, hatches, crane rails, equipment and component supports, etc.) are addressed in the bulk structural commodities review (Bulk Structural Commodities (Section 2.4.36)).

In-scope structures are shown on License Renewal Drawing *LR-STRUCTURES*. Unit 1 UFSAR, Appendix B, Table B.1-1, and Unit 2 UFSAR, Table 3.2-2, provide a listing of seismic Category I structures.

2.4.1 ALTERNATE INTAKE STRUCTURE (COMMON)

Structure Description

The Alternate Intake Structure is a non-Quality Assurance Category I structure, which was seismically designed for the historic earthquake of 0.03 g (surface motion), and is classified as augmented quality. It is common to both Unit 1 and Unit 2. This structure is approximately 60 by 42 by 62 feet high and it is located east of the plant and east of the Shippingport Bridge. The Alternate Intake Structure houses the Unit 1 Auxiliary River Water System and the Unit 2 Standby Service Water System, which provide heat sink requirements after a postulated loss of the seismic Category I Intake Structure.

The periphery of the Alternate Intake Structure is a cofferdam formed by sheet piling driven to refusal on bedrock. Sheet piling driven on the north-south centerline of the periphery forms two separate cells. These cells are the River Water bays from which the Standby Service Water and Auxiliary River Water pumps take suction. Above the reinforced concrete operating floor, the structure is steel framed and enclosed with insulated metal siding and roof decking. Extending away from the sheet piling on the south side of the structure is a reinforced concrete pipe chamber. Embedded within the lower concrete floor and providing support for the pipe chamber are steel H-piles driven to refusal.

Structure Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2):

- Provides structural support to nonsafety-related equipment whose failure could prevent satisfactory accomplishment of required safety-related functions.

10 CFR 54.4(a)(3): None

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 9.16.1	Section 9.2.1.2.1

Components Subject to Aging Management Review

Table 2.4-1 lists the component types that require aging management review and their intended functions.

Table 3.5.2-1, *Containments, Structures, and Component Supports – Alternate Intake Structure (Common) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-1
Alternate Intake Structure (Common)
Components Subject to Aging Management Review

Component Type	Intended Function
Metal siding	EN, SNS
Roof decking	SNS
Screen guides	SNS
Steel piling (sheet piling, H-piles)	HS, SCW, SNS
Structural steel: beams, columns, plates and trusses	SNS
Trash racks	SNS
Traveling screen casing and associated framing	SNS
Ventilation hoods and framing	SNS
Exterior walls (above grade)	SNS
Exterior walls (below grade)	HS, SNS
Floor slabs	SNS
Foundation mat	HS, SNS
Pipe chamber	SNS
Pipe enclosure	SNS
Sump pit	SNS

2.4.2 AUXILIARY BUILDING

Unit 1 Structure Description

The Unit 1 Auxiliary Building is a safety-related, seismic Category I structure consisting of a basement and three upper stories. It is approximately 120 feet wide by 104 feet long by 69 feet high and is located adjacent to and south of the Unit 1 Service Building. The structure houses various safety- and nonsafety-related primary systems.

The Auxiliary Building is supported on a reinforced concrete foundation mat. The uppermost floor supports a seismically designed steel superstructure. The reinforced concrete floors and walls below this elevation and for certain components above this elevation are designed to provide tornado protection for safety-related equipment and piping, and to provide biological shielding where required. The uppermost, heavily reinforced concrete slabs can accommodate a collapse of the steel framed structure that exists above them and not detrimentally affect the integrity of the Class I portions located below the concrete slabs. This structure also includes the Category I pipe trench beneath the lower level of the Auxiliary Building to the Reactor Containment Building, and the pipe trench beneath the Auxiliary Building to the Fuel Building.

The portion of the Auxiliary Building basement which houses safety-related equipment is protected against flooding to El. 730'-0" (i.e., the probable maximum flood (PMF) elevation). The only equipment needed to maintain plant shutdown during the PMF, and located below the elevation of the PMF, are the charging pumps. The charging pumps are located within watertight cubicles which have waterstops at construction joints below the elevation of the PMF. The remainder of the basement is allowed to flood in order to eliminate hydraulic uplift. The pipe trenches to the Containment and Fuel Building from the Auxiliary Building are also allowed to flood.

The roof is supported by the steel framing above the uppermost floor slab. The building's roof consists of a built-up membrane on steel decking. Exterior walls of the Auxiliary Building are concrete or protected, insulated metal fluted siding. The siding is designed to blow-off under tornado loading in order to reduce wind loads on the superstructure. Some of the interior walls within the Auxiliary Building are concrete block walls.

Unit 2 Structure Description

The Unit 2 Auxiliary Building is a safety-related, seismic Category I structure consisting of a basement and three upper stories. It is approximately 120 feet by 145 feet by 63 feet high. The Auxiliary Building is supported on a reinforced concrete foundation mat. The roof and walls of the top story are predominantly steel framed with metal siding and metal roof decking, with the exception of the ventilation core area, component cooling surge tank cubicle and the air conditioning room which are reinforced concrete. The remainder of the structure is reinforced concrete. Concrete walls and floors are designed to provide tornado protection for safety-related equipment and piping and to provide biological shielding where required. The top story steel framing is not designed to provide tornado protection.

External flood protection is provided up to El. 730'-0" by the concrete exterior walls and foundation mat. Construction joints in the exterior walls and mats below El. 730'-0" are provided with waterstops.

Although the top story, seismic Category I steel frame structure above El. 773'-6" is not tornado protected, the concrete ventilation core area, component cooling surge tank cubicle and air conditioning room above El. 773'-6" are tornado-protected. The metal siding around the top story is designed to blow-off under tornado loading in order to reduce wind loads on the superstructure.

Unit 1 and Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event);
- Provides missile barrier (internally or externally generated); and,
- Provides structural or functional support to safety-related equipment.

10 CFR 54.4(a)(2):

- Provides structural or functional support to nonsafety-related equipment whose failure could prevent satisfactory accomplishment of required safety functions (includes II/I considerations).

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP and SBO.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections	Sections
2.3.3	3.6B.1.3.3.1
2.4	3.6B.1.3.4.2
2.6.3.1	3.8.4.1.1
2.7.2.2	3.8.4.8
2.7.5	Figure 2.4-17
6.6.2	Figure 2.5.4-41
9.6.3	
9.7.1	
9.7.2	
9.13.2	
11.3.2.7	
14.1.14.2	
Table 2.7-1	

Components Subject to Aging Management Review

Table 2.4-2 lists the component types that require aging management review and their intended functions.

Table 3.5.2-2, *Containments, Structures, and Component Supports – Auxiliary Building – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-2
Auxiliary Building
Components Subject to Aging Management Review

Component Type	Intended Function
Unit 1 Auxiliary Building	
Metal siding	EN, SNS, SRE, SSR
Roof decking	EN, SNS, SRE, SSR
Structural steel: beams, columns, plates and trusses	SNS, SRE, SSR
Beams and columns	SNS, SRE, SSR

Table 2.4-2
Auxiliary Building
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Exterior walls (above grade)	EN, FB, MB, SNS, SRE, SSR
Exterior walls (below grade)	EN, FB, FLB, SNS, SRE, SSR
Floor slabs	FB, MB, SNS, SRE, SSR
Foundation mat (includes sump pit)	EN, FB, FLB, SHD, SNS, SRE, SSR
Interior walls	EN, FB, FLB, MB, SHD, SNS, SRE, SSR
Pipe trench to Containment (including sump pit)	EN, FB, MB, SNS, SRE, SSR
Pipe trench to Fuel Building	EN, FB, SNS, SRE, SSR
Unit 2 Auxiliary Building	
Metal siding	EN, SNS, SRE, SSR
Missile Shields	MB
Roof decking	EN, SNS, SRE, SSR
Structural steel: beams, columns, plates and trusses	SNS, SRE, SSR
Beams and columns	SNS, SRE, SSR
Exterior walls (above grade)	EN, FB, MB, SNS, SRE, SSR
Exterior walls (below grade)	EN, FB, FLB, SNS, SRE, SSR
Floor slabs	FB, MB, SNS, SRE, SSR
Foundation mat (includes sump pit)	EN, FB, FLB, SHD, SNS, SRE, SSR
Interior walls	EN, FB, FLB, MB, SHD, SNS, SRE, SSR
Roof slab	FB, MB, SNS, SRE, SSR

2.4.3 BORIC ACID TANK BUILDING (UNIT 1 ONLY)

Unit 1 Structure Description

The Unit 1 Boric Acid Tank Building is a nonsafety-related, seismic Category II structure. The building is located adjacent to the southeast corner of the Auxiliary Building, and houses the boric acid hold tank and associated equipment, none of which is in-scope for license renewal. The Boric Acid Tank Building is approximately 20 feet by 23 feet by 43 feet high. The building comprises a reinforced concrete structure and foundation mat. The structure has a steel beam supported concrete roof deck; there are no interior walls or floors. The building is designed so that it will not collapse onto nearby structures.

Unit 1 Structure Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2):

- Prevent damage to adjacent structures that are safety-related structures due to collapse during a seismic event.

10 CFR 54.4(a)(3): None

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
None	Not applicable

Components Subject to Aging Management Review

Table 2.4-3 lists the component types that require aging management review and their intended functions.

Table 3.5.2-3, *Containments, Structures, and Component Supports – Boric Acid Tank Building (Unit 1 only) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-3
Boric Acid Tank Building (Unit 1 only)
Components Subject to Aging Management Review

Component Type	Intended Function
Roof decking	SNS
Structural steel: beams, columns, plates and trusses	SNS
Exterior walls (above grade)	SNS
Foundation mat (includes sump pit)	SNS
Roof slab	SNS

2.4.4 CABLE TUNNEL

Unit 1 Structure Description

The Unit 1 Cable Tunnel is a safety-related, seismic Category I subsurface structure housing safety-related electrical equipment. The Cable Tunnel is that portion of the Service Building allowing for transfer of cable from the Cable Vault structure to the cable tray area within the Service Building.

The Cable Tunnel is situated northeast of the Cable Vault. A portion of the Cable Tunnel runs vertically from El. 725'-6" to El. 754'-6", and another portion runs horizontally from the Cable Vault area northward into the Service Building. The Cable Tunnel is a reinforced concrete structure.

The vertical and horizontal portions of the Cable Tunnel are divided into two compartments by a concrete wall that runs north-south. There are no equipment or floor drains in the Cable Tunnel. Waterstops are located within construction joints, all around the Cable Tunnel.

Unit 2 Structure Description

The Unit 2 Cable Tunnel is a safety-related, seismic Category I subsurface structure extending approximately 82 feet from the Auxiliary Building to the Control Building. The foundation mat, walls and roof of the Cable Tunnel are reinforced concrete. The concrete structure of the Cable Tunnel provides tornado protection for safety-related electrical systems.

The bottom of the Cable Tunnel's foundation is at El. 709'-6". It was designed so that it has external flood protection up to El. 730 feet.

Unit 1 and Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event);
- Provides missile barrier (internally or externally generated); and,
- Provides structural or functional support to safety-related equipment.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 2.3.1.2 2.7.3.2.4 9.7.2	Sections 3.8.4.1.8 9.5A.1.3.53.1 Figure 2.4-17 Figure 2.5.4-41

Components Subject to Aging Management Review

Table 2.4-4 lists the component types that require aging management review and their intended functions.

Table 3.5.2-4, *Containments, Structures, and Component Supports – Cable Tunnel – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-4
Cable Tunnel
Components Subject to Aging Management Review

Component Type	Intended Function
Unit 1 Cable Tunnel	
Ceiling slabs	EN, MB, FB, SNS, SRE, SSR
Exterior walls (below grade)	EN, FB, FLB, SNS, SRE, SSR
Floor slabs	FB, FLB, SNS, SRE, SSR
Interior walls	FB, SNS, SRE, SSR
Unit 2 Cable Tunnel	
Ceiling slabs	EN, MB, FB, SNS, SRE, SSR
Exterior walls (below grade)	EN, FB, FLB, SNS, SRE, SSR

Table 2.4-4
Cable Tunnel
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Foundation mat	FB, FLB, SNS, SRE, SSR
Interior walls	FB, SNS, SRE, SSR

2.4.5 CHEMICAL ADDITION BUILDING (UNIT 1 ONLY)

Unit 1 Structure Description

The Unit 1 Chemical Addition Building is a safety-related, seismic Category I structure, approximately 19 by 31 by 11 feet high, and located adjacent to the refueling water storage tank. The building is supported on a reinforced concrete foundation mat and has metal siding and a metal roof deck. The Chemical Addition Building houses the caustic tank pumps of the Containment Depressurization System.

The top of the foundation for the Chemical Addition Building is at El. 735'-0" which is the site grade elevation. The roof is supported by steel framing and consists of a built-up membrane on steel decking.

Unit 1 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event); and,
- Provides structural or functional support to safety-related equipment.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3): None

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 2.2.2.5	N/A

Components Subject to Aging Management Review

Table 2.4-5 lists the component types that require aging management review and their intended functions.

Table 3.5.2-5, *Containments, Structures, and Component Supports – Chemical Addition Building (Unit 1 only) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-5
Chemical Addition Building (Unit 1 only)
Components Subject to Aging Management Review

Component Type	Intended Function
Metal Siding	EN, SSR
Roof decking	EN, SSR
Structural steel: beams, columns, plates and trusses	SSR
Foundation mat (includes sump pit)	EN, FLB, SSR

2.4.6 CONDENSATE POLISHING BUILDING (UNIT 2 ONLY)

Unit 2 Structure Description

The Unit 2 Condensate Polishing Building is a nonsafety-related, seismic Category II structure (designed not to collapse in a Safe Shutdown Earthquake). It contains no safety-related equipment. The Condensate Polishing Building consists of a basement and three upper stories.

The Condensate Polishing Building is L-shaped with the main portion being approximately 44 by 141 feet and a maximum of 93 feet high. It is located adjacent to, and west of, the Waste Handling Building. The structure is supported on a reinforced concrete foundation mat. The roof, walls, and floor slabs of the building are reinforced concrete. Steel framing supports the metal decking beneath the reinforced concrete roof slab. The steel framing was designed such that it is not a secondary missile under earthquake, tornado or probable maximum precipitation conditions.

Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2):

- Prevents damage to adjacent safety-related structures due to collapse during a seismic event.

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Not applicable	Sections 3.8.4.1.17 3.6B.1.3.4.3

Components Subject to Aging Management Review

Table 2.4-6 lists the component types that require aging management review and their intended functions.

Table 3.5.2-6, *Containments, Structures, and Component Supports – Condensate Polishing Building (Unit 2 only) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-6
Condensate Polishing Building (Unit 2 only)
Components Subject to Aging Management Review

Component Type	Intended Function
Roof decking	SNS, SRE
Structural steel: beams, columns, plates and trusses	SNS, SRE
Exterior walls (above grade)	SNS, SRE
Exterior walls (below grade)	SNS, SRE
Floor slabs	SNS, SRE
Foundation (includes sump pit)	SNS, SRE
Interior walls	SNS, SRE
Roof slab	SNS, SRE

2.4.7 CONTROL BUILDING (UNIT 2 ONLY)

Unit 2 Structure Description

The Unit 2 Control Building is a safety-related, seismic Category I structure. It consists of three stories and is adjacent to the Unit 1 Service Building. The top story of the Control Building contains the Unit 2 portion of the main control room, the computer room, and the heating ventilation and air conditioning equipment room. The lower two stories house switchgear, cable spreading areas, and other associated equipment. The main control room is common to both units, but is split between the Unit 2 Control Building and the Unit 1 Service Building. The Unit 1 portion of the main control room is located in the Unit 1 Service Building (Section 2.4.26).

The Unit 2 Control Building is approximately 69 feet by 89 feet by 45 feet high. The building is supported on a reinforced concrete foundation mat. The roof and walls are reinforced concrete. The concrete structure is designed to provide tornado protection. The exterior and some interior concrete walls have missile barrier functions. The main entrance incorporates light structural steel framing, siding and roof decking. Construction joints in the exterior walls and mats below El. 730'-0" are provided with waterstops.

Positive pressure is provided in the control room envelope to minimize in-leakage during emergency operation through doors, ducts, pipes and cable penetrations that could be caused by wind effects and pressure variations. Special construction features are provided to maintain the leak-tightness of the common control room boundary, including compression seals for access doors and equipment removal hatches, penetration seals for pipes, ducts and electrical penetrations, and water trap seals for sanitary piping. Shielding provided by the main control room walls, and the separation of the main control room from the Containment structure, ensures that an operator would be able to remain in the main control room for 30 days after an accident and not receive an integrated dose in excess of 5 Rem.

Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event);
- Provides missile barrier (internally or externally generated); and,
- Provides structural or functional support to safety-related equipment.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP and SBO.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Not applicable	Sections 3.8.4.1.5 6.4.2.3 12.3.2.9 Figure 2.4-17 Figure 2.5.4-41

Components Subject to Aging Management Review

Table 2.4-7 lists the component types that require aging management review and their intended functions.

Table 3.5.2-7, *Containments, Structures, and Component Supports – Control Building (Unit 2 only) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-7
Control Building (Unit 2 only)
Components Subject to Aging Management Review

Component Type	Intended Function
Control room ceiling	SNS, SSR
Metal siding	EN, SNS, SRE
Structural steel: beams, columns, plates and trusses	EN, SNS, SRE
Roof decking	EN, SNS, SRE
Beams and columns	SNS, SRE, SSR
Exterior walls (above grade)	EN, FB, MB, SNS, SRE, SSR

Table 2.4-7
Control Building (Unit 2 only)
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Exterior walls (below grade)	EN, FB, FLB, SNS, SRE, SSR
Floor slabs	FB, MB, SNS, SRE, SSR
Foundation mat (includes sump pit)	EN, FB, FLB, SNS, SRE, SSR
Interior walls	EN, FB, MB, SHD, SPB, SNS, SRE, SSR
Roof slab	EN, FB, MB, SNS, SRE, SSR

2.4.8 DECONTAMINATION BUILDING

Unit 1 Structure Description

The Unit 1 Decontamination Building is a nonsafety-related, seismic Category II steel frame and siding building, abutting the west end of the Fuel Building's south wall. The building is used to decontaminate plant equipment. The structure contains no safety-related equipment, and is designed so that its steel framing will not collapse and endanger systems or structures requiring protection.

The 77-foot tall, single-story building is designed to provide an area in which equipment can be decontaminated without releasing activity to the environment in an uncontrolled manner. A 125-ton trolley runs through the high bay portion of the Decontamination Building, into the west end of the Fuel Building to the north, and on a high level runway out over the road to the south. The central area is separated by 8-foot high stainless steel walls and the floor is covered with stainless steel to form an area in which fuel casks and other equipment can be washed down. A stainless steel pad is provided to protect the floor under heavy objects.

Unit 2 Structure Description

The Unit 2 Decontamination Building is a safety-related, seismic Category I structure that houses fuel cask washing equipment. The building is classified as safety-related; however, it contains no safety-related equipment. The Decontamination Building is integral to the Fuel Building, and these two buildings are described in the Unit 2 UFSAR (Section 3.8.4.1.4) as one structure; however, for license renewal purposes, they are evaluated separately. The Decontamination Building is situated north of the Fuel Building's east end. It is approximately 33 feet by 33 feet. A concrete wall and a set of doors separate the two buildings.

The Decontamination Building is supported on a continuous reinforced concrete foundation mat. The 77-foot tall, single story building's roof and walls are concrete. External flood protection is provided up to El. 730'-0" (the PMF elevation). Waterstops were provided at all construction joints below El. 730'-0". The Decontamination Building is also a tornado protected structure.

Steel framing supports the metal decking beneath the reinforced concrete roof slab. The steel framing was designed such that it is not a secondary missile under earthquake, tornado or probable maximum precipitation conditions. A 125-ton trolley runs from the Fuel Building to the decontamination area (building) to the yard area. The top of the crane girder is at El. 797'-10". The Decontamination Building contains the cask wash down area.

Unit 1 and Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides structural or functional support to safety-related equipment (Unit 2 only).

10 CFR 54.4(a)(2):

- Provides structural or functional support to nonsafety-related equipment whose failure could prevent satisfactory accomplishment of required safety functions (includes II/I considerations) (Unit 1 only).

10 CFR 54.4(a)(3): None

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 9.12.2.2 9.15.1 9.15.2 Table 1.7-1	Sections 3.8.4.1.4 9.1.5.3.2 3.6B.1.3.4.3 Table 2.5.4-4 Table 3.2-1

Components Subject to Aging Management Review

Table 2.4-8 lists the component types that require aging management review and their intended functions.

Table 3.5.2-8, *Containments, Structures, and Component Supports – Decontamination Building – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-8
Decontamination Building
Components Subject to Aging Management Review

Component Type	Intended Function
Unit 1 Decontamination Building	
Metal siding	SNS
Roof decking	SNS
Structural steel: beams, columns, plates and trusses	SNS
Foundation (includes sump pit)	SNS
Unit 2 Decontamination Building	
Roof decking	SSR
Structural steel: beams, columns, plates and trusses	SSR
Exterior walls (above grade)	MB, SSR
Foundation (includes sump pit)	SSR
Interior walls	SSR
Roof slab	MB, SSR

2.4.9 DIESEL GENERATOR BUILDING

Unit 1 Structure Description

The Unit 1 Diesel Generator Building is a safety-related, seismic Category I structure located adjacent to and south of the Unit 1 Fuel Building. The Diesel Generator Building is a single-story reinforced concrete structure approximately 57 by 61 by 32 feet high (including two penthouses, one each for gas and air exhaust), which is supported on a reinforced concrete foundation mat. The concrete structure is designed to provide tornado protection. The Emergency Diesel Generators are housed within the Diesel Generator Building.

The walls and roof are constructed of reinforced concrete. A pipe trench passes under the 12-inch thick wall between the two diesel generator compartments. This pipe trench contains fuel oil cross connections running between the two diesel fuel oil pump suction and discharge pipelines.

The Diesel Generator Building is above the PMF elevation. The two fuel oil storage tanks for the diesel generators are buried and covered with a two-foot thick concrete slab for missile protection. The fuel oil piping outside of the Diesel Generator Building is also buried and covered with a two-foot thick concrete slab for missile protection. In addition, the lines from each tank are separated from one another by a concrete partition.

Unit 2 Structure Description

The Unit 2 Diesel Generator Building is a safety-related, seismic Category I structure, housing the Emergency Diesel Generators. It is a two-story building approximately 78 feet wide by 88 feet long by 57 feet high. The Diesel Generator Building is supported on a reinforced concrete foundation mat, and the building is above the PMF elevation. The roof and walls are constructed of reinforced concrete, making the building a tornado and missile-protected structure. The Emergency Diesel Generator fuel oil tanks are embedded in concrete below the Diesel Generator Building. The underground concrete enveloping the tanks is part of the building structure.

The Diesel Generator Building is separated into two areas, each housing one Emergency Diesel Generator and its associated auxiliary systems and electrical/ control equipment. The two areas are separated by a concrete wall designed to withstand a safe shutdown earthquake, fire or missiles. Each of the redundant fuel oil systems is located in a separate room within the Diesel Generator Building.

The south exterior wall of the Diesel Generator Building is adjacent to the system station service transformer, and has a 3-hour fire rating. The exterior door to the diesel generator in this area is 3-hour fire rated. Penetrations of exterior and interior walls forming the fire barriers are sealed with a material having a rating equivalent to the barrier rating except for the intake and exhaust openings which are separated by sufficient distance to preclude the possibility of fire propagation.

Unit 1 and Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event);
- Provides missile barrier (internally or externally generated); and,
- Provides structural or functional support to safety-related equipment.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP and SBO.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections	Sections
8.5.2.3	8.3.1.1.15
8.5.2.4	8.3.1.1.18
9.7.2	9.4.6.3
	9.5.4.2
	9.5.8.2
	9.5.8.3
	3.6B.1.3.4.2
	3.6B.1.3.4.3
	9.5.1.6.1
	9.5A.1.3.16.1
	9.5A.1.3.53.1

Components Subject to Aging Management Review

Table 2.4-9 lists the component types that require aging management review and their intended functions.

Table 3.5.2-9, *Containments, Structures, and Component Supports – Diesel Generator Building – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-9
Diesel Generator Building
Components Subject to Aging Management Review

Component Type	Intended Function
Unit 1 Diesel Generator Building	
Exterior walls (above grade)	EN, FB, MB, SRE, SSR
Foundation	EN, FB, FLB, SRE, SSR
Interior walls	EN, FB, SRE, SSR
Roof slab	EN, FB, MB, SRE, SSR
Slab covers (includes buried trench)	MB
Unit 2 Diesel Generator Building	
Exterior walls (above grade)	EN, FB, MB, SRE, SSR
Floor slabs	FB, SRE, SSR
Foundation	EN, FB, FLB, SRE, SSR
Interior walls	EN, FB, MB, SRE, SSR
Roof slab	EN, FB, MB, SRE, SSR
Tank embedment	FLB, SRE, SSR

2.4.10 EMERGENCY OUTFALL STRUCTURE (UNIT 2 ONLY)

Unit 2 Structure Description

The Unit 2 Emergency Outfall Structure is a safety-related, seismic Category I structure. The Emergency Outfall Structure is a dual chambered overflow weir. It is approximately 21 feet by 35 feet by 24 feet high, situated about 1,900 feet west of the center of the Unit 2 Reactor Containment Building. It protects the ends of the service water lines from missile impact and maintains proper hydraulic head within the Service Water System. In the event that normal flow for service water via the Circulating Water System to the Cooling Tower is blocked, service water discharge is re-routed to the Emergency Outfall Structure to the Ohio River.

The Emergency Outfall Structure is constructed of reinforced concrete. The bottom of the Emergency Outfall Structure is at El. 710'-0" and the top is at approximately El. 737'-5". It is designed to remain functional when subjected to postulated tornado and tornado-generated missile loadings.

Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (external flooding event);
- Provides missile barrier (internally or externally generated); and,
- Provides structural or functional support to safety-related equipment.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for SBO.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Not applicable	Section 3.8.4.1.11 Figure 2.4-17 Appendix 2.5E - Sect. 1.0

Components Subject to Aging Management Review

Table 2.4-10 lists the component types that require aging management review and their intended functions.

Table 3.5.2-10, *Containments, Structures, and Component Supports – Emergency Outfall Structure (Unit 2 only) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-10
Emergency Outfall Structure (Unit 2 only)
Components Subject to Aging Management Review

Component Type	Intended Function
Foundation mat	FLB, SRE, SSR
Overflow weir wall and chamber walls	FLB, MB, SRE, SSR
Exterior walls (below grade)	FLB, SRE, SSR
Roof slab	MB, SRE, SSR

2.4.11 EMERGENCY RESPONSE FACILITY DIESEL GENERATOR BUILDING (COMMON)

Structure Description

The Emergency Response Facility (ERF) Diesel Generator Building (also known as the Reserve Generator Building) is a nonsafety-related, non-seismic structure. It is approximately 41 feet by 23 feet by 16 feet high and is located south of the plant and north of the ERF Substation Building. The ERF Diesel Generator Building houses the nonsafety-related ERF diesel generator (also known as the reserve generator or the black diesel). This generator provides power via the ERF Substation switchgear to power the Unit 1 dedicated auxiliary feedwater pump, the Unit 1 AMSAC panel, and equipment associated with the Unit 2 diesel-driven station air compressor. Nearby concrete foundations for diesel generator support equipment are also included with the ERF Diesel Generator Building for evaluation. These foundations are for the ERF diesel generator cooler (water-to-air heat exchanger) and cooler fans.

The building is a pre-engineered steel framed structure with insulated metal siding and a metal roof. It is a single story structure. The building has a concrete mat foundation. The top of the foundation/floor slab is at El. 735'-6".

A 30,000 gallon fuel oil storage tank is buried near the ERF Diesel Generator Building and provides the ERF diesel with a 7-day fuel oil supply. The bottom of the tank is approximately at El. 732'-6" (i.e., above the PMF elevation of El. 730'-0") and rests on undisturbed earth. A concrete roof slab and walls partially cover the tank. The slab and walls form a vault for piping and equipment associated with the tank. Pea gravel was used to fill the space between the sheet piling and the tank and vault.

Structure Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 8.4.5	None

Components Subject to Aging Management Review

Table 2.4-11 lists the component types that require aging management review and their intended functions.

Table 3.5.2-11, *Containments, Structures, and Component Supports – Emergency Response Facility Diesel Generator Building (Common) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-11
Emergency Response Facility Diesel Generator Building (Common)
Components Subject to Aging Management Review

Component Type	Intended Function
Metal siding and roofing	SRE
Structural steel: beams, columns, plates and trusses	SRE
Floor slabs	SRE
Foundation	FLB, SRE
Foundation for ERF diesel generator cooler (radiator)	SRE
Pipe trench	SRE
Fuel tank vault walls	SRE
Fuel tank vault roof	SRE

2.4.12 EMERGENCY RESPONSE FACILITY SUBSTATION BUILDING (COMMON)

Structure Description

The Emergency Response Facility (ERF) Substation Building is a nonsafety-related, non-seismic structure. It is approximately 60 feet by 30 feet by 32 feet high and it is located south of the plant. The ERF Substation Building houses two 4KV buses and associated 480 VAC, 120 VAC and 125 VDC equipment necessary to supply select equipment in Unit 1 and Unit 2.

The building consists of two stories with the first floor at El. 735'-6" and the second floor at El. 751'-6". Grade on the north and west sides of the building is at El. 735'-0" and grade on the south and east sides varies between El. 735'-0" and El. 744'-0". A concrete retaining wall and sheet piling are situated on the west side of the building at its south end. The foundation for the building is concrete. The building primarily is a steel framed structure with metal siding; some exterior walls are concrete with metal siding. Roofing consists of insulated metal decking with a built-up membrane.

Structure Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for ATWS and FP.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 8.4.5	None

Components Subject to Aging Management Review

Table 2.4-12 lists the component types that require aging management review and their intended functions.

Table 3.5.2-12, *Containments, Structures, and Component Supports – Emergency Response Facility Substation Building (Common) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-12
Emergency Response Facility Substation Building (Common)
Components Subject to Aging Management Review

Component Type	Intended Function
Battery racks	SRE
Floor and roof decking	SRE
Metal siding	SRE
Structural steel: beams, columns, plates and trusses	SRE
Floor slabs	SRE
Foundation	SRE
Exterior walls (above grade)	SRE
Exterior walls (below grade)	SRE
Interior walls	SRE

2.4.13 EQUIPMENT HATCH PLATFORM

Unit 1 Structure Description

The Unit 1 Equipment Hatch Platform is a safety-related, seismic Category I structure located adjacent to and southwest of the Containment. It is approximately 27 feet by 27 feet by 46 feet high. The platform provides protection for the equipment hatch.

The Equipment Hatch Platform is supported on a reinforced concrete foundation mat and has reinforced concrete walls and slabs. This structure is designed to provide tornado-generated missile protection for the Containment equipment hatch. The Equipment Hatch Platform includes a removable missile shield enclosure consisting of various wall assemblies and roof sections.

The bottom of the Equipment Hatch Platform foundation is at El. 732'-0", which is above the PMF elevation at El. 730 feet.

Unit 2 Structure Description

The Unit 2 Equipment Hatch Platform is a safety-related, seismic Category I structure. It is adjacent and northeast of the Reactor Containment Building. It is approximately 29 feet by 31 feet by 49 feet high. The platform provides protection for the equipment hatch.

The Equipment Hatch Platform is supported on a reinforced concrete foundation mat. The walls and slabs are reinforced concrete. The Equipment Hatch Platform is designed to provide tornado generated missile protection for the Containment equipment hatch. The Equipment Hatch Platform consists of removable walls and slabs.

The Equipment Hatch Platform is protected from external flooding up to El. 730 feet.

Unit 1 and Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides missile barrier (internally or externally generated); and,
- Provides structural or functional support to safety-related equipment;

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3): None

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 5.2.4.8	None

Components Subject to Aging Management Review

Table 2.4-13 lists the component types that require aging management review and their intended functions.

Table 3.5.2-13, *Containments, Structures, and Component Supports – Equipment Hatch Platform – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-13
Equipment Hatch Platform
Components Subject to Aging Management Review

Component Type	Intended Function
Unit 1 Equipment Hatch Platform	
Beams and columns	SSR
Exterior walls (above grade)	EN, MB, SSR
Foundation	SSR
Interior walls	MB, SSR
Roof slab	EN, MB, SSR
Unit 2 Equipment Hatch Platform	
Exterior walls (above grade)	EN, MB, SSR
Floor slabs	SSR
Foundation	SSR
Interior walls	MB, SSR
Roof slab	EN, MB, SSR

2.4.14 FUEL BUILDING

Unit 1 Structure Description

The Unit 1 Fuel Building is a safety-related, seismic Category I structure approximately 41 by 107 by 60 feet high. It is located adjacent to and south of the Unit 1 Auxiliary Building. The Fuel Building contains the new and spent fuel and associated fuel handling facilities, including the reinforced concrete fuel pool.

The Fuel Building is supported on a continuous reinforced concrete foundation mat. The seismic superstructure is designed so that the steel framing will not collapse and endanger SSCs required for safe shutdown. The Fuel Building's superstructure is clad in metal siding which is designed to blow off under tornado loading in order to reduce wind loads on the superstructure. The elevation of the Fuel Building is higher than the PMF elevation.

The Fuel Building contains racks for both new and used fuel. New fuel assemblies are stored dry in a steel and concrete structure within the Fuel Building. The new fuel storage racks consist of a stainless steel support structure into which stainless steel fuel guide assemblies are bolted. Spent fuel is stored in stainless steel racks underwater in a separate pool area. Neutron absorbing material (Boral) installed in spent fuel racks assure subcriticality of spent fuel.

The sides of the spent fuel pool are six feet thick concrete. The pool is filled with borated water and is fully lined with stainless steel to prevent leakage.

Unit 2 Structure Description

The Unit 2 Fuel Building is a safety-related, seismic Category I structure, approximately 44 feet by 110 feet. The Fuel Building contains the new and spent fuel and associated fuel handling facilities, including the reinforced concrete fuel pool.

The Fuel Building is supported on a continuous reinforced concrete foundation mat. The roof and walls are of reinforced concrete. Reinforced concrete is provided for biological shielding where required. Safety-related equipment and the spent fuel are protected against tornadoes and tornado-generated missiles. Steel framing supports the metal decking under the reinforced concrete roof slab. The steel framing was designed such that it is not a secondary missile under earthquake, tornado or probable maximum precipitation conditions. External flood protection is provided up to El. 730'-0".

New fuel assemblies are stored dry in a steel and concrete structure within the Fuel Building. The new fuel storage racks consist of a stainless steel support structure into which stainless steel fuel guide assemblies are bolted. The spent fuel storage racks are housed within the spent fuel pool and are made of stainless steel and contain a neutron absorbing material, Boraflex (boron carbide in nonmetallic binders). The spent fuel rack criticality analysis does not take credit for any of this neutron absorbing material, but credits soluble boron to maintain the spent fuel in a subcritical condition.

The sides of the spent fuel pool, three of which also form part of the Fuel Building exterior walls, are six-foot thick concrete. The pool is lined with stainless steel and is filled with borated demineralized water.

Unit 1 and Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event);
- Provides missile barrier (internally or externally generated); and,
- Provides structural or functional support to safety-related equipment.

10 CFR 54.4(a)(2):

- Provides structural or functional support to nonsafety-related equipment whose failure could prevent satisfactory accomplishment of required safety functions (includes II/I considerations).

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections	Sections
1A.61	4.3.2.6
2.6.3.3	9.1.1.2
5.2.1	9.1.1.3
9.5.2	9.1.2.2
9.5.3.3	9.1.2.3
9.12.1.1	9.1.4.2.1
9.12.2.1	9.1.5.1
11.3.2.5	12.3.2.5
14.1.14.2	3.6B.1.3.4.3
	Table 2.5.4-4
	Table 3.7B-2

Components Subject to Aging Management Review

Table 2.4-14 lists the component types that require aging management review and their intended functions.

Table 3.5.2-14, *Containments, Structures, and Component Supports – Fuel Building – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-14
Fuel Building
Components Subject to Aging Management Review

Component Type	Intended Function
Unit 1 Fuel Building	
Metal siding	EN, SNS, SRE, SSR
New fuel storage racks	EN, SNS, SSR
Roof decking	EN, SNS, SRE, SSR
Spent fuel pool weir gates	SNS, SSR
Fuel transfer tube gate	SNS, SSR
Spent fuel pool liner	SPB, SSR

Table 2.4-14
Fuel Building
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Spent fuel storage racks	EN, SSR
Structural steel: beams, columns, plates and trusses	SRE, SSR
Exterior walls (above grade)	EN, FB, MB, SSR
Exterior walls (below grade)	EN, FB, FLB, SSR
Foundation (includes sump pit)	EN, FB, FLB, SSR
Interior walls	FB, SNS, SSR
Spent fuel pool	MB, SHD, SSR
Spent fuel rack neutron absorbers	SHD, SSR
Unit 2 Fuel Building	
New fuel storage racks	EN, SNS, SSR
Roof decking	EN, SNS, SRE, SSR
Spent fuel pool weir gates	SNS, SSR
Fuel transfer tube gate	SNS, SSR
Spent fuel pool liner	SPB, SSR
Spent fuel storage racks	EN, SSR
Structural steel: beams, columns, plates and trusses	SRE, SSR
Exterior walls (above grade)	EN, FB, MB, SSR
Exterior walls (below grade)	EN, FB, FLB, SSR
Foundation (includes sump pit)	EN, FB, FLB, SSR
Interior walls	FB, SNS, SSR
Roof slab	FB, MB, SSR
Spent fuel pool	MB, SHD, SSR

2.4.15 GASEOUS WASTE STORAGE VAULT

Unit 1 Structure Description

The Unit 1 Gaseous Waste Storage Vault (also referred to in the Unit 1 UFSAR as the Waste Gas Storage Area) is a safety-related, seismic Category I structure located directly east of the Fuel Building. It measures approximately 37 by 23 by 43 feet and houses nonsafety-related gaseous waste decay tanks.

The Gaseous Waste Storage Vault is a reinforced concrete structure designed to provide tornado protection. This structure is mostly underground. There are no sources of water located above or connected to the Gaseous Waste Storage Vault that could cause flooding. The vault is structurally protected against the ingress of water from the PMF.

Unit 2 Structure Description

The Gaseous Waste Storage Vault (enclosure) is a nonsafety-related, seismic Category II structure located north of the Fuel Building. It is an in-ground, one story structure 37 by 52 by 15 feet high, with an at-grade entrance of 11 by 18.25 by 10 feet high. The structure houses the nonsafety-related gaseous waste storage tanks.

The Gaseous Waste Storage Vault is supported on a reinforced concrete foundation mat. The walls, roof, and interior structures are also reinforced concrete. Steel framing supports the internal stairs. The steel framing was designed such that it is not a secondary missile under earthquake, tornado or probable maximum precipitation conditions.

Unit 1 and Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event) (Unit 1 only);
- Provides missile barrier (internally or externally generated) (Unit 1 only); and,
- Provides structural or functional support to safety-related equipment (Unit 1 only).

10 CFR 54.4(a)(2):

- Prevents damage to adjacent safety related structures due to collapse during a seismic event (Unit 2 only).

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP (Unit 2 only).

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 6.6.3 9.7.2 Table B.1-1	Sections 3.8.4.1.17 3.8.4.1.18 3.6B.1.3.4.3 Figure 3.8-56 Table 12.2-7

Components Subject to Aging Management Review

Table 2.4-15 lists the component types that require aging management review and their intended functions.

Table 3.5.2-15, *Containments, Structures, and Component Supports – Gaseous Waste Storage Vault – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-15
Gaseous Waste Storage Vault
Components Subject to Aging Management Review

Component Type	Intended Function
Unit 1 Gaseous Waste Storage Vault	
Blowout panels	PR, SSR
Exterior walls (below grade)	EN, FLB, SSR
Foundation	EN, FLB, SSR
Interior walls	EN, SSR
Roof slab	EN, SSR

Table 2.4-15
Gaseous Waste Storage Vault
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Unit 2 Gaseous Waste Storage Vault	
Structural steel: beams, columns, plates and trusses	SNS, SRE
Foundation (includes sump pit)	SNS, SRE
Exterior walls (above grade)	SNS, SRE
Exterior walls (below grade)	SNS, SRE
Interior walls	SNS, SRE
Roof slab	SNS, SRE

2.4.16 GUARD HOUSE (COMMON)

Structure Description

The Guard House is a nonsafety-related, non-seismic structure that houses a diesel generator. A day tank within the diesel generator room provides fuel for the diesel generator.

The Guard House was originally a single story structure. A two-story addition and penthouse were added onto the original structure and onto its west end. Foundations for the original Guard House and Guard House addition are slabs on grade with perimeter footings. Steel framing supports the second floor and roof over the original Guard House. Pre-cast concrete floor and roof panels support the second floor and roof of the addition.

Structure Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
None	None

Components Subject to Aging Management Review

Table 2.4-16 lists the component types that require aging management review and their intended functions.

Table 3.5.2-16, *Containments, Structures, and Component Supports – Guard House – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-16
Guard House
Components Subject to Aging Management Review

Component Type	Intended Function
Battery racks	SRE
Floor and roof decking	SRE
Structural steel: beams, columns, plates and trusses	SRE
Exterior walls (above grade)	SRE
Floor slabs	SRE
Foundation	SRE
Interior walls	SRE

2.4.17 INTAKE STRUCTURE (COMMON)

Structure Description

The Intake Structure is a safety-related, seismic Category I structure, common to both Unit 1 and Unit 2. It is approximately 85 feet by 112 feet by 122 feet high. The seismic Category I portion of the Intake Structure houses the Unit 1 river water pumps, the Unit 2 service water pumps, the motor-driven fire pump, and the engine-driven fire pump. The structure protects these pumps and related equipment from tornados and tornado-generated missiles as well as flooding. The reinforced concrete slabs in this structure are capable of accommodating the collapse of the light steel framed structures above. Included as part of the Intake Structure are the seismic Category I duct lines and manholes that protect the electrical supply to the river water and service water pumps.

The Intake Structure is founded on a reinforced concrete mat at El. 637'-0" which was placed on compacted select granular fill overlying dense in-situ granular soil extending to bedrock. The Intake Structure is constructed of reinforced concrete to the operating floor at El. 705'-0". Above this elevation, a steel superstructure with steel siding encloses four separate, but contiguous, missile protected, reinforced concrete pump rooms/ cubicles. The cubicles have a common two-foot thick concrete roof at El. 730'-0"; the north end of the roof is opened across its width for ventilation purposes. The associated exhaust vents and covers have gaskets for flood protection. The pump cubicle roof also supports several chemical addition tanks (e.g., clamicide). Water stops provided in construction joints in the concrete exterior walls protect the pump rooms/ cubicles from flooding. The roof, at an approximate elevation of 760 feet, is constructed of steel decking supported on the steel framing.

An overhead bridge crane, the screenwell crane, services the traveling screen areas, the raw water pumps, the Unit 1 river water pumps, and the Unit 2 service water pumps.

Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event);
- Provides missile barrier (internally or externally generated);
- Provides structural or functional support to safety-related equipment; and,
- Provides heat sink during a design basis event.

10 CFR 54.4(a)(2):

- Provides structural or functional support to nonsafety-related equipment whose failure could prevent satisfactory accomplishment of required safety functions (includes II/I considerations).

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP and SBO.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 2.1.7.1 2.3.10 2.7.3.2 2.7.3.2.2 9.9.2	Sections 2.4.7.2 3.4.1 Figure 2.5.4-66 Table 3.7B-2

Components Subject to Aging Management Review

Table 2.4-17 lists the component types that require aging management review and their intended functions.

Table 3.5.2-17, *Containments, Structures, and Component Supports – Intake Structure (Common) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-17
Intake Structure (Common)
Components Subject to Aging Management Review

Component Type	Intended Function
Metal siding	SNS
Roof decking	EN, SNS, SRE, SSR
Screen guides	EN, SRE, SSR

Table 2.4-17
Intake Structure (Common)
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Structural steel: beams, columns, plates and trusses	EN, SNS, SRE, SSR
Trash racks	SNS, SRE, SSR
Traveling screen casing and associated framing	SNS
Valve stuffing box floor penetrations	FLB
Vent hoods and framing	FLB, SRE, SSR
Exterior walls (above grade)	EN, FB, FLB, MB, SNS, SRE, SSR
Exterior walls (below grade)	EN, FLB, HS, SNS, SRE, SSR
Floor slabs	EN, FB, FLB, SNS, SRE, SSR
Foundation mat	EN, FLB, HS, SNS, SRE, SSR
Interior walls	EN, FB, FLB, SNS, SRE, SSR
Line anchors	EN, SSR
Pump intake chamber walls	EN, HS, SCW, SNS, SRE, SSR
Roof slab	EN, FB, MB, SSR, SRE
Sump pits	SNS, SRE, SSR
Ventilation air intake stacks	EN, FLB, SNS, SRE, SSR

2.4.18 MAIN STEAM AND CABLE VAULT

Unit 1 Structure Description

The Unit 1 Main Steam and Cable Vault is a safety-related, seismic Category I structure. This structure includes the following seismic Category I areas: Cable Vault, Main Steam Valve Area, pump room below the Main Steam Valve Area (housing auxiliary feedwater and quench spray pumps), and the Main Steam Valve Area ventilation room. The structure is situated directly north and east of the Reactor Containment Building. It includes a pipe chase/tunnel at the west end of the Cable Vault area which connects with the Turbine Building.

The Main Steam and Cable Vault is a reinforced concrete structure. The bottom of the foundation is at El. 712'-0". Floor slabs are at several elevations corresponding to four floors, with some floor elevations slightly different within different areas. The pipe chase/tunnel is at El. 722'-6". The roof slab elevations vary. Lower roof slabs are at El. 762'-0" and 767'-10" and the upper roof slab is at El. 783'-8" / 791'-2". Exterior walls are concrete. However, the Main Steam and Cable Vault shares the Reactor Containment Building wall; no additional wall separates the Main Steam and Cable Vault from the Reactor Containment. Some of the interior walls within the Cable Vault are concrete block walls. Steel platforms and associated framing comprise the Main Steam Valve Area which is enclosed by concrete walls above El. 751'-0" which extend to the underside of the upper roof slab at El. 788'-6". Removable roof slabs are located above the Main Steam Valve Area.

The lowest elevation of the Cable Vault and Main Steam Valve Areas are subject to flooding due to the Pipe Tunnel that connects to the Turbine Building, which floods during the PMF. The pump room below the Main Steam Valve Area and Main Steam Valve Area ventilation rooms is higher than the PMF elevation and not subject to flooding. Equipment in the Main Steam and Cable Vault needed to maintain plant shutdown during the PMF is located above El. 730 feet. Waterstops were used at Main Steam and Cable Vault below-grade construction joints and around the Pipe Tunnel.

Manually operated louvers installed in the Main Steam Valve Area are designed such that any pressure build-up caused by a high energy line break will force them to open and relieve the pressure, so as not to jeopardize building integrity.

Unit 2 Structure Description

The Unit 2 Main Steam and Cable Vault is a safety-related, seismic Category I, multi-level structure. It is approximately 94 feet wide (at its widest part) by 138 feet long by 77 feet high. The bottom of the Main Steam and Cable Vault foundation is at El. 712'-6". The Cable Vault (and rod control area) houses safety-related valves and piping which penetrate the Containment and run between other safety-related areas. The Main Steam Valve Area contains safety-related components required for steam and feedwater isolation.

The structure is supported on a reinforced concrete foundation mat. The remainder of the multi-level structure is reinforced concrete. Waterstops were installed at construction joints up to El. 731 feet, which is above the PMF elevation. The structure provides tornado protection for safety-related systems, including the main steam isolation valves. One portion of the roof is steel-framed and has metal roof decking. The steel framed roof section is non-seismic Category I and is not designed for seismic or tornado loads.

Safety-related valves and electrical/control equipment in the Main Steam and Cable Vault are located above the highest internal flood elevation. High energy lines are located on El. 718'-6" of the Cable Vault (and rod control area). No significant internal flood levels would be experienced from postulated high energy breaks since the steam release to the Main Steam Valve Area results in a pressure increase and a major portion of the released mass is vented through openings in the Main Steam Valve Area to reduce pressure. Vent panels are located in the walls near the Main Steam Valve Area roof.

The Main Steam and Cable Vault is identified as a target for turbine missiles. Reinforced concrete was used for walls, roofs and floors designated as missile protection. Ventilation or penetration openings in the various buildings housing essential shutdown equipment are protected by reinforced concrete walls, labyrinths or steel missile barriers.

Two axial fans are located in the Cable Vault area. Missile shields were added for postulated missiles ejected through their inlet air flex connections.

Unit 1 and Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event);
- Provides missile barrier (internally or externally generated);
- Provides structural or functional support to safety-related equipment; and,
- Provides shielding against HELB.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP and SBO.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 5.2.1 9.7.2	Sections 3.6B.1.3.4.2 3.6B.1.3.4.3 3.8.4.1.3 Figure 2.4-17 Figure 2.5.4-41 Figure 3.5-1 Table 3.5-12

Components Subject to Aging Management Review

Table 2.4-18 lists the component types that require aging management review and their intended functions.

Table 3.5.2-18, *Containments, Structures, and Component Supports – Main Steam and Cable Vault – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-18
Main Steam and Cable Vault
Components Subject to Aging Management Review

Component Type	Intended Function
Unit 1 Main Steam and Cable Vault	
Structural steel: beams, columns, plates and trusses	EN, SNS, SRE, SSR
Beams and columns	SNS, SRE, SSR
Exterior walls (below grade)	EN, FB, FLB, SNS, SRE, SSR
Exterior walls (above grade)	EN, FB, MB, SNS, SRE, SSR
Floor slabs	FB, MB, SNS, SRE, SSR
Foundation	EN, FB, FLB, SNS, SRE, SSR
Interior walls	EN, FB, SNS, SRE, SSR
Pipe chase/tunnel (El. 722'-6")	EN, FB, FLB, SNS, SRE, SSR

Table 2.4-18
Main Steam and Cable Vault
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Roof slab	EN, FB, MB, SNS, SRE, SSR
Sump pit	SNS, SRE, SSR
Unit 2 Main Steam and Cable Vault	
Missile shields	MB
Roof Decking	EN, SNS, SRE, SSR
Structural steel: beams, columns, plates and trusses	EN, SNS, SRE, SSR
Beams and columns	SNS, SRE, SSR
Exterior walls (above grade)	EN, FB, MB, SNS, SRE, SSR
Exterior walls (below grade)	EN, FB, FLB, SNS, SRE, SSR
Floor slabs	FB, MB, SNS, SRE, SSR
Foundation (includes sump pit)	EN, FB, FLB, SNS, SRE, SSR
Interior walls	EN, FB, MB, SNS, SRE, SSR
Pipe Tunnel/Trench, (El. 718'-6")	EN, FB, FLB, SNS, SRE, SSR
Roof slab	EN, FB, MB, SNS, SRE, SSR

2.4.19 PIPE TUNNEL

Unit 1 Structure Description

The Unit 1 Pipe Tunnel is a safety-related, seismic Category I structure that contains safety-related piping between the refueling water storage tank (RWST) and the Cable Vault area - including the trench routing to the Safeguards Building.

The tunnel is a subsurface structure, extending from the RWST to the Cable Vault, near its junction with the Cable Vault area, and includes the attached trench that runs approximately 60 feet southwest and then 38'-6" south to the west side of the Safeguards Building. The tunnel measures approximately 20 feet long by 12'-8" wide by about 9'-6" high.

Waterstops are provided at construction joints all around the tunnel and a shake space separates the tunnel from adjacent structures. All essential piping from the RWST is routed through missile-protected pipe trenches before entering the Safeguards Building by way of the Cable Vault structure, or directly via the trench.

Unit 2 Structure Description

There are two Unit 2 Pipe Tunnels that are safety-related, seismic Category I structures. One tunnel connects the Service Building, Main Steam and Cable Vault and Safeguards Building and is approximately 10 feet wide by 42 feet long by 13 feet deep. The second tunnel connects the Auxiliary Building with the Fuel Building. It is 7 feet wide by 6 feet deep with one portion enlarging to 14 feet wide by 8 feet deep. This tunnel's overall length is 164 feet.

The Pipe Tunnels are constructed of reinforced concrete and are protected against external flooding up to El. 730 feet. These tunnels provide tornado protection except for approximately 103 feet of length adjacent to the Fuel and Decontamination Buildings. This unprotected length of tunnel does not contain safety-related piping, components or equipment.

Unit 1 and Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event);
- Provides structural or functional support to safety-related equipment; and,
- Provides missile barrier (internally or externally generated).

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP (Unit 1 only).

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 6.4.2	Section 3.8.4.1.14

Components Subject to Aging Management Review

Table 2.4-19 lists the component types that require aging management review and their intended functions.

Table 3.5.2-19, *Containments, Structures, and Component Supports – Pipe Tunnel – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-19
Pipe Tunnel
Components Subject to Aging Management Review

Component Type	Intended Function
Unit 1 Pipe Tunnel	
Exterior walls (below grade)	EN, FB, FLB, SRE, SSR
Foundation (includes sump pit)	EN, FB, FLB, SRE, SSR
Roof slab	EN, FB, MB, SRE, SSR
Unit 2 Pipe Tunnel	
Exterior walls (below grade)	EN, FLB, SNS, SSR
Foundation	EN, FLB, SNS, SSR
Interior walls	SNS, SSR
Ceiling slabs	EN, MB, SNS, SSR

2.4.20 PRIMARY DEMINERALIZED WATER STORAGE TANK PAD AND ENCLOSURE

Unit 1 Structure Description

The Unit 1 Primary Demineralized Water Storage Tank Pad and Enclosure is a safety-related, seismic Category I structure. It is located in the yard west of the Reactor Containment Building. It is approximately 38 feet by 41 feet by 45 feet high. The enclosed tank supplies the auxiliary feedwater pumps. Also included in association with this structure are the nonsafety-related, non-seismic Turbine Plant Demineralized Water Storage Tank Pad and the Auxiliary Demineralized Water Storage Tank Pad, which, similar to the Primary Demineralized Water Storage Tank Pad and Enclosure, support tanks within the scope of license renewal. The Turbine Plant Demineralized Water Storage Tank Pad and the Auxiliary Demineralized Water Storage Tank Pad support tanks that supply the nonsafety-related dedicated auxiliary feedwater pump, and are within the scope of license renewal for Fire Protection concerns.

The Primary Demineralized Water Storage Tank Enclosure is supported on a three-foot thick reinforced concrete foundation pad, which also supports the tank. The pad is located above the PMF elevation. The walls of the enclosure are two-foot thick reinforced concrete. The roof slab is the standard site tornado missile design for concrete depth and reinforcing, but was installed using permanent steel decking supported by steel beams that allowed erection of the tank prior to the roof's installation. The walls and roof of the enclosure for the Primary Demineralized Water Storage Tank Pad are designed for the design basis tornado wind pressure and associated missile.

The Turbine Plant and Auxiliary Demineralized Water Storage Tank Pads are reinforced concrete foundations. The pads are located higher than the standard project flood (El. 705 feet), but not the PMF, and the two tanks are not designed for PMF flood conditions. The pad for the auxiliary demineralized water storage tank is supported by steel piles driven to the top of bedrock.

Unit 2 Structure Description

The Unit 2 Primary Demineralized Water Storage Tank Pad and Enclosure is a safety-related, seismic Category I structure. It is located east of the Safeguards Building and south of the RWST. It is approximately 38 feet by 40 feet by 46 feet high. The enclosed tank supplies the auxiliary feedwater pumps. Also included in association with this structure is the nonsafety-related, non-seismic Demineralized Water Storage Tank Pad. This pad supports the nonsafety-related demineralized water storage tank that provides additional water volume for the Auxiliary Feedwater System to support safe shutdown.

The primary demineralized water storage tank and associated enclosure are supported on a reinforced concrete foundation mat. The walls and roof of the enclosure are reinforced concrete. The roof slab is the standard site tornado missile design for concrete depth and reinforcing, but was installed using permanent steel decking supported by steel beams that allowed erection of the tank prior to the roof's installation. The enclosure is designed to provide tornado protection. The pad for the primary demineralized water storage tank is square and is separated from the RWST pad by a shake space. The pad is located above the PMF elevation.

The Demineralized Water Storage Tank Pad is a reinforced concrete foundation similar in shape to a regular octagon, but it has only seven sides because two sides are extended to form a square corner. The pad is located above the PMF elevation, and is not adjacent to other structures.

Unit 1 and Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event);
- Provides missile barrier (internally or externally generated); and,
- Provides structural or functional support to safety-related equipment.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 2.7.2.2 2.7.3.2 2.7.5 9.11.2 9.11.3 10.3.5.2.2 14.1.8.1	Sections 1.2.3 9.5.1.8.15 9.5A.1.2.3.1.1 10.4.9.2 5A.2.1 Table 3.2-1 (Note 4)

Components Subject to Aging Management Review

Table 2.4-20 lists the component types that require aging management review and their intended functions.

Table 3.5.2-20, *Containments, Structures, and Component Supports – Primary Demineralized Water Storage Tank Pad and Enclosure – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-20
Primary Demineralized Water Storage Tank Pad and Enclosure
Components Subject to Aging Management Review

Component Type	Intended Function
Unit 1 Primary Demineralized Water Storage Tank Pad and Enclosure	
Piles	SRE
Roof decking	EN, SRE, SSR
Structural steel: beams, columns, plates and trusses	SRE, SSR
Exterior walls (above grade)	EN, FB, MB, SRE, SSR
Foundation (auxiliary demineralized water storage tank pad)	SRE
Foundation (turbine plant demineralized water storage tank pad)	SRE
Foundation (primary demineralized water storage tank pad, including valve pit)	SRE, SSR
Roof slab	EN, FB, SRE, SSR
Unit 2 Primary Demineralized Water Storage Tank Pad and Enclosure	
Roof decking	EN, SRE, SSR
Structural steel: beams, columns, plates and trusses	SRE, SSR
Exterior walls (above grade)	EN, MB, SRE, SSR
Foundation (demineralized water storage tank pad, including sump pit)	SRE

Table 2.4-20
Primary Demineralized Water Storage Tank Pad and Enclosure Components Subject to Aging Management Review (continued)

Component Type	Intended Function
Foundation (primary demineralized water storage tank pad, including sump pit)	SRE, SSR
Roof slab	EN, MB, SRE, SSR

2.4.21 PRIMARY WATER STORAGE BUILDING (UNIT 1 ONLY)

Unit 1 Structure Description

The Unit 1 Primary Water Storage Building (also known as the Primary Grade Water Pump Room) is a safety-related, seismic Category I structure. The building is located east of the Diesel Generator Building, and is approximately 64 by 50 by 13 feet high. There is no safety-related equipment in the building.

The Primary Water Storage Building is a reinforced concrete structure designed to provide tornado protection. Carbon dioxide storage is located on the second (ground) floor of the building. The second floor is just above grade.

Unit 1 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event);
- Provides missile barrier (internally or externally generated).

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
None	Not applicable

Components Subject to Aging Management Review

Table 2.4-21 lists the component types that require aging management review and their intended functions.

Table 3.5.2-21, *Containments, Structures, and Component Supports – Primary Water Storage Building (Unit 1 only) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-21
Primary Water Storage Building (Unit 1 only)
Components Subject to Aging Management Review

Component Type	Intended Function
Exterior walls (above grade)	MB, SRE
Exterior walls (below grade)	FLB, SRE
Floor slabs	SRE
Foundation (includes sump pit)	FLB, SRE
Interior walls	SRE
Roof slab	MB, SRE

2.4.22 REACTOR CONTAINMENT BUILDING

Unit 1 Structure Description

The Unit 1 Reactor Containment Building is a safety-related, seismic Category I structure entirely designated as Quality Assurance Class I. It is a heavily reinforced concrete, steel-lined vessel with a flat base mat, cylindrical walls and a hemispherical dome. The base mat is a soil-bearing concrete slab 10 feet thick, without projections below its lower surface. A 4-inch thick (minimum) layer of porous concrete sub-base underlies the mat and consists of coarse aggregate bound with a water-cement paste.

The inside diameter of the Containment cylinder is 126 feet and the cylinder wall is 4'-6" thick. The distance from the top of the mat to the inside of the dome crown is approximately 185 feet. The dome has a thickness of 2'-6" and an inside radius of 63 feet.

The inside faces of the Containment wall, dome and mat are lined with steel liner plates to make the Reactor Containment Building vapor and gas tight. The liner plate is anchored to the concrete Containment. The steel liner is not credited with the structural integrity of the Containment shell. The Containment internal structures consist of heavily reinforced concrete walls and slabs.

The Containment exterior (shell) and the Containment interior, consisting of the primary shield wall and crane wall, interconnected by floors and radial walls, and interior structural steel, are independent of one another and designed with different loading criteria.

The exterior, below-grade surface of the concrete shell and foundation mat has a continuous waterproofing membrane to protect the Containment structure against water seepage during flood stages resulting from the standard project flood elevation and the PMF elevation.

As a supplementary feature, water relief systems are provided at two instrument pits external to the cylindrical Containment wall. Concrete shafts extend from grade to the instrument pits located in the top of the Containment concrete foundation mat. The pits extend downward through the foundation mat into the porous concrete layer beneath it. The system is intended to indicate the presence of flood water if it were to penetrate the Containment waterproof membrane. Accumulated water will cause an alarm in the control room.

Note: An approximate 17' x 21' area on the south face of the Reactor Containment Building at El. 767'-0" was removed and replaced for a steam generator replacement project access opening, Spring 2006. The opening was closed using the original reinforcing steel, and new reinforcing steel for a few bars that were replaced due to damage.

Descriptions for various structural components comprising the Reactor Containment Building, follow:

- Containment Liner – The liner is a continuous steel membrane, supported by and anchored to the inside of the Containment structure. Its function is to act as a gas-tight membrane. The cylindrical portion of the liner is 3/8 inches thick, the hemispherical dome liner is ½ inch thick, and the flat floor covering the mat is ¼ inch thick, with the exception of areas where the transfer of loads through it requires a reinforced thickness. These areas incorporate bridging bars to which the vertical reinforcing steel required for load transfer is attached above and below. The bottom mat liner plate is covered with a two-foot thick layer of reinforced concrete that will insulate it from temperature effects. The interface between the cylindrical portion of the liner and the two-foot thick layer of reinforced concrete is sealed with caulking that forms a moisture barrier. All welded seams in the mat, cylindrical liner wall, hemispherical dome and liner penetrations are covered with continuously welded test channels, except in the repaired SGRP access opening area where they were deleted. Anchor bars, or "bridging bars" form an integral part of the steel liner plate.

- Crane Wall – The crane wall is an integral part of the internal concrete structure and supports the polar crane.

- Emergency Air Lock – The emergency air lock is a subassembly of the equipment hatch, consisting of a double-closure removable penetration approximately 12'-6" long and 5 feet in diameter, attached to the removable equipment hatch cover by bolted, flanged connections with double O-rings. A leakage test tap is located between the O-rings. A 30 inch diameter opening is located at each end of the lock for personnel access. The entire emergency air lock can be independently pressurized for testing. The air lock barrel, outside of the equipment hatch, is enclosed full-length in insulation to conserve heat input at the Containment end. The heat retained is sufficient to prevent loss of metal ductility during frigid weather.

- Equipment Hatch – The equipment hatch is a single closure penetration assembly approximately 8'-4" in length and 14'-6" in diameter. The equipment hatch cover is mounted inside the Containment structure and is provided with a two point suspension hoist and sliding rail for storage. The cover is double-gasketed with a leakage test tap between O-rings. A removable concrete missile shield protects the equipment hatch and the emergency airlock.

- Fuel Transfer Canal – The fuel transfer canal is an extension of the refueling cavity reaching to the Containment end of the transfer tube. The fuel transfer canal is formed by two concrete shield walls. The outer end of the canal is a concrete shield wall that extends up to the same elevation as the top of the refueling cavity. The walls and floors are lined with stainless steel. A shield ring consisting of interlocking blocks of concrete and steel, between the Containment liner and the end of the canal, prevent radiation streaming from the transfer tube when the fuel is passing through it.

- Fuel Transfer Tube – The fuel transfer tube is used to transfer fuel elements between the reactor and the fuel pool. The tube is provided with expansion bellows for differential building movement and a blind flange with dual O-rings inside Containment that is installed for plant power operation.

- Penetrations – Penetrations through the Containment are divided into the following categories: piping penetrations with a diameter of 9 inches nominal pipe size (NPS) or less; piping penetrations with a diameter larger than 9 inches NPS; personnel access and equipment access hatches; and, electrical service penetrations.

  For cold penetrations, the piping is welded to a plate flange which is anchored to the Containment concrete wall. Each thermally hot penetration is designed with adequate space between the sleeve and the piping for required pipe insulation. Penetration cooling units limit the radial heat flow from thermally hot pipe penetrations, which will keep the temperature of the concrete below 150 degrees F.

  Each electrical penetration group passes through 8-inch or 12-inch NPS diameter pipe sleeves. The sleeves are welded into the 1-inch thick Containment liner insert plate with a test channel around the seal weld for periodic halogen leak testing.

- Personnel Air Lock – The personnel air lock is a double-closure penetration, 15 feet long and 7 feet in diameter. Each closure is flanged and double-gasketed with a leakage tap between O-rings. The entire personnel hatch can be independently pressurized for testing. Each door (closure) consists of three major components: a non-rotating head, a rotating locking ring and a fixed shell extension flange. The doors are interlocked such that if one door is open, the other cannot be unlatched. Each door of the personnel air lock is provided with an 18-inch diameter, double-gasketed, emergency manhole and cover.

- Pressurizer Support – The pressurizer vessel is mounted to a rigid ring girder which is suspended from the operating floor by four hanger columns.

- Primary Shield Wall – The reinforced concrete primary shield wall forms the reactor cavity at the center of the Containment structure, and houses the Neutron Shield Tank and reactor. The primary shield wall is designed for internal pressure due to pipe ruptures, earthquake loads and thermal loads.

- Reactor Cavity Water Seal – The reactor cavity water seal is a permanent, welded, stainless steel membrane that spans horizontally between the Reactor Vessel perimeter flange and the reactor cavity floor (i.e., it covers the annulus around the vessel). The membrane is supported by a stainless steel frame that sustains all hydrostatic and potential accident and seismic loads imposed on the membrane. Stainless steel encased, borated concrete blocks are located beneath the structural members to provide shielding for reactor radiation streaming. During power operation, air exits upward from around the reactor through multiple openings in the membrane. The air provides cooling for the components and concrete surrounding the reactor. During refueling, the ventilation openings are covered so that borated water can fill the pool above the seal.

- Reactor Vessel Support – The Reactor Vessel is supported by six sliding foot assemblies mounted on the Neutron Shield Tank (NST) that allow for radial and rotational movement of the vessel and piping. The NST has an upper portion comprising a water-filled, double walled cylindrical tank which transfers the Reactor Vessel's lateral loadings to the reinforced primary shield wall through a four-foot high band of grout around its perimeter. The lower section of the NST is a single-walled, steel cylinder that transfers the vessel's vertical loads to the concrete mat of the Containment structure.

- Refueling Cavity – The refueling cavity is a seismic Category I reinforced concrete structure lined with stainless steel. During refueling operations, this cavity is filled with borated water to form a pool above the Reactor Vessel. The refueling cavity is separated into two sections by a permanent stainless steel cofferdam.

- Steam Generator and Reactor Coolant Pump Supports – The materials used for the steam generator and reactor coolant pump supports are for the most part commercially available structural shapes. High strength quenched and tempered alloy steels are used for local attachments at the steam generator and reactor coolant pump support pads, in the hydraulic snubber assemblies, in the pump support columns and in the steam generator struts. The steam generator support system consists of an upper support ring and a lower support frame.

  The lower support frame is a weldment fabricated of structural steel shapes. The support frame slides radially on lubricated bearing plates located under each corner column in order to permit thermal expansion of the reactor coolant piping from the reactor to the steam generator. The support frame has large shear blocks on two sides which fit into embedments in the cubicle floor that prevent lateral sliding of the frame.

  Each reactor coolant pump is mounted in a support frame which permits radial thermal expansion. The frame is supported vertically above the cubicle floor by three pin-ended columns, which allows for lateral movement in all directions to accommodate coolant pipe thermal growth.

Unit 2 Structure Description

The Unit 2 Reactor Containment Building is a safety-related, seismic Category I structure that consists of a cylindrical wall with a flat base and hemispherical dome made of concrete, and is completely lined with steel. The reinforced concrete construction provides support and strength against internal pressure and the steel liner provides vapor tightness. The distance between the top of the mat to the inside of the dome crown is approximately 185 feet. The 4'-6" thick cylindrical wall is about 122 feet high, and the 2'-6" thick dome has an inside radius of about 63 feet. The base mat is a soil-bearing concrete slab 10 feet thick. A 4-inch thick (minimum) layer of porous concrete sub-base underlies the mat.

The Containment exterior (shell and mat) structure and the Containment internal structure, consisting of interior concrete and steel components, are independent of one another and designed with different loading criteria.

The Containment is not structurally integral with any of the structures surrounding it. A shake space is provided between the Containment and the adjacent structures to accommodate relative structural movement.

The exterior, below-grade surface of the concrete shell and foundation mat has a continuous waterproofing membrane to protect the Containment structure against water seepage. As a supplementary feature, a water relief system comprising two open instrument pits, is provided in the floor of the Safeguards Area. The pits extend down to the porous concrete layer beneath the Containment mat. The system is intended to indicate the presence of flood water if it were to penetrate the Containment's waterproof membrane. Accumulated water will cause an alarm in the control room.

The Containment internal structures consist of heavily reinforced concrete walls and slabs which are designed to support the principal nuclear steam supply equipment. The interior concrete also provides radiation shielding for equipment and operating personnel, supplies protection from missiles resulting from component failure, provides restraint for various piping systems and acts as a jet impingement barrier during postulated pipe breaks. Radial reinforced concrete walls, extending between the primary shield wall and the crane wall (which supports the polar crane) separate the internals into cubicles which house three steam generators and reactor coolant pumps and the pressurizer. The Containment floor, shell, dome, and interior concrete are passive heat sinks.

Descriptions for various structural components comprising the Reactor Containment Building follow:

- Containment Liner – Inside faces of the Containment wall, dome and mat are lined with steel liner plates which act as a leak-tight membrane. The liner plate for the walls is 3/8 inch thick and for the dome it is ½ inch thick. A ¼ inch plate is used over the base mat. The steel liner is not assumed to provide any contribution to the structural integrity of the Containment shell. Bridging bars are used in areas where the transfer of loads through the floor liner plate is required; the bridging bars are an integral part of the steel liner.

  Except at the in-core instrumentation area and the sump areas, the bottom liner plate is overlaid with an approximately two-foot thick reinforced concrete slab. The slab provides anchorage and support for equipment located in the base of the Containment structure. The interface between the slab and the wall liner plate is sealed with caulking that forms a moisture barrier.

- Crane Wall – The reinforced concrete crane wall is located concentrically to the primary shield wall and is supported by reinforced concrete columns extending from the foundation mat. The polar crane is supported at the top of the crane wall.

- Emergency Air Lock – The emergency air lock is a subassembly of the equipment hatch consisting of a double closure removable penetration 12'-6" long and 5 feet in diameter attached to the removable equipment hatch cover by a bolted flange connection with double O rings. A leakage test tap is located between the O rings. A 30-inch diameter opening (door) is located at each end of the air lock for personnel access. Test connections are provided for periodic leak testing between the double seals on each door Insulation on the air lock barrel conserves heat input at the Containment end.

- Equipment Hatch – The equipment hatch is a single closure penetration approximately 8'-4" long with an inside diameter of 14'-6". The equipment hatch cover is mounted inside the Containment structure and is provided with a hoist with two point suspension and a sliding rail for storage. The cover is double-gasketed with a leakage test tap between the O-rings.

- Fuel Transfer Tube Enclosure – The fuel transfer tube enclosure is provided to transfer fuel between the refueling canal in the Containment structure and the spent fuel pool in the Fuel Building. The fuel transfer tube penetration consists of a stainless steel pipe installed inside an enclosure. The inner pipe acts as the fuel transfer tube. The enclosure consists of three sets of bellows, plus the connecting sleeves and is welded to the Containment liner. A leak chase ring allows for leak testing of welds essential to the integrity of the penetration. The bellows expansion joints compensate for differential movement between the Containment structure and the Fuel Building. The fuel transfer tube enclosure is sealed off with a blind flange that has double gaskets. The blind flange is kept in place except during refueling to ensure Containment integrity. The shield around the fuel transfer tube has a multiple labyrinth configuration with an equivalent thickness of 60 inches of concrete.

- Fuel Transfer Canal – The fuel transfer canal (also known as the refueling canal) is a stainless steel lined reinforced concrete structure that houses the fuel transfer system which provides for transfer of new and spent fuel elements between the Fuel Building (spent fuel pool) and Reactor Containment (refueling canal) during refueling. Concrete shield walls, 54 to 72 inches thick, are provided for the fuel transfer canal.

- Penetrations – Penetrations are used to carry piping and electrical services through the Containment wall and are grouped into those that are 12 inches in diameter or less or piping penetrations larger than 12 inches in diameter. Piping penetrations consist of approximately six feet long pipe sleeves with heavy reinforcing plates near both ends.

  For cold penetrations, the piping is welded to a reinforcing plate which is anchored to the Containment concrete wall.

  Each penetration carrying hot piping is equipped with a water-cooled cooling unit on the inside of the penetration encompassing that length of the sleeve which is covered by concrete. Hot penetrations are designed with a space between the sleeve and the piping for pipe insulation and for the installation of the cooling unit.

  The basic electrical penetration is installed in a 12 or 18 inch steel pipe. Electrical penetration sleeves are welded into the Containment liner reinforcement plate with a test channel around the seal weld for periodic leak testing.

- Personnel Air Lock – The personnel air lock is a double closure penetration, 7 feet wide and 15 feet long. Each closure is flanged and double-gasketed with a leakage test tap between the O rings. Each closure consists of three major components: a non-rotating head, a rotating locking ring and a fixed shell extension flange and is provided with an 18 inch diameter, double-gasketed emergency manhole and cover.

- Pressurizer Support – The pressurizer is supported by an integral, flanged skirt bolted to a welded ring girder. The ring girder and vessel are suspended from the charging floor by four hanger columns. Two brackets welded to the ring girder are attached to the wall through slotted holes which restrain all motions except vertical translation.

- Primary Shield Wall – The reinforced concrete primary shield wall forms the reactor cavity at the center of the Containment structure, and houses the Neutron Shield Tank and Reactor Vessel. The primary shield wall is designed for internal pressure due to pipe ruptures, earthquake loads and thermal loads.

- Reactor Cavity Water Seal – The reactor cavity water seal is a permanent, welded, stainless steel membrane that spans horizontally between the Reactor Vessel perimeter flange and the reactor cavity floor (i.e., it covers the annulus around the vessel). The membrane is supported by a stainless steel frame that sustains all hydrostatic and potential accident and seismic loads imposed on the membrane. Stainless steel encased, borated concrete blocks are located beneath the structural members to provide shielding for reactor radiation streaming. During power operation, air exits upward from around the reactor through multiple openings in the membrane. The air provides cooling for the components and concrete surrounding the reactor. During refueling, the ventilation openings are covered so that borated water can fill the pool above the seal.

- Reactor Vessel Structural Support – The Reactor Vessel's structural support is the Neutron Shield Tank (NST), a vertical, heavy-walled (1.5 in. thick), steel cylinder that transfers vertical loads to the reinforced concrete mat and horizontal loads to the surrounding primary shield wall through a grout band. Its upper section is double-walled and filled with water to absorb neutrons exiting the vessel's core region, and to provide thermal protection to the surrounding structure. The Reactor Vessel bears directly on six adjustable support devices, one beneath each of the Reactor Vessel nozzles. The devices in-turn bear upon the top of the double-walled portion of the NST.

- Refueling Cavity – The refueling cavity is located above the Reactor Vessel and is a stainless steel lined reinforced concrete structure. The liner is classified, designed and constructed as seismic Category II. The walls of the refueling cavity are 42 inches thick and provide secondary shielding. The refueling cavity is only flooded with borated water during plant shutdown for refueling. The water level in the refueling cavity keeps the radiation level within acceptable limits while fuel assemblies are being removed from and inserted into the core.

- Steam Generator and Reactor Coolant Pump Supports -The steam generator support system consists of an upper ring and a lower support frame.

  The upper support ring transmits horizontal forces from the steam generator through four tangential load trains to the reinforced concrete charging floor. Two tangential load trains are equipped with hydraulic snubbers which permit motion of the steam generator due to thermal expansion of the Reactor Coolant System.

The lower steam generator support frame is a weldment fabricated from structural steel shapes and plates. The support frame slides on lubricated bearing plates located under each corner column to permit radial thermal expansion of the Reactor Coolant System. The four corner columns transmit vertical forces from the steam generator to the cubicle floor. The support frame has large shear blocks on two sides which fit into embedments in the cubicle floor.

The reactor coolant pump is mounted within a frame weldment, fabricated from structural steel shapes and plates, supported above the cubicle floor by three pin-ended columns which provide vertical support while allowing free movement in the horizontal plane.

Unit 1 and Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event);
- Provides missile barrier (internally or externally generated);
- Provides structural or functional support to safety-related equipment;
- Provides shielding against radiation; and,
- Provides boundary or essentially leak tight barriers to protect public health and safety in the event of postulated design basis events.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 5.2 5.3.3 9.12.2.2 Table 11.3-1 Appendix B - Section B.1.3	Sections 2.5.4.5.1 3.4.1 3.7B.2.2.1 3.8.1 3.8.3 3.8.5.1.1 5.4.14.2 6.2.1.2.3.3 9.1.2.2 9.1.2.3 9.1.4.2.1 12.3.2.5 Table 2.5.4-4 Table 3.7B-2 Table 6.2-2 Table 12.3-3

Components Subject to Aging Management Review

Table 2.4-22 lists the component types that require aging management review and their intended functions.

Table 3.5.2-22, *Containments, Structures, and Component Supports – Reactor Containment Building – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-22
Reactor Containment Building
Components Subject to Aging Management Review

Component Type	Intended Function
Unit 1 Reactor Containment Building	
Containment liner	EN, SPB, SSR
Containment liner and liner penetrations	EN, SPB, SSR

Table 2.4-22
Reactor Containment Building
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Control rod drive shield	MB, SSR
Control rod drive supports	MB, SSR
Equipment hatch and emergency air lock	EN, SPB, SSR
Fuel transfer canal liner	SSR
Fuel transfer tube	SSR
Fuel transfer tube expansion bellows	SSR
Neutron shield tank	SHD, SSR
Neutron shield tank shielding	SHD
Penetrations (electrical and mechanical)	SPB, SSR
Penetration bellows	SPB, SSR
Personnel air lock	SPB, SSR
Pressurizer supports and safety valve restraints	SSR
Radiation shield panels	SHD
Reactor cavity water seal	FLB, SSR
Reactor internals storage stand	SSR
Recirculation spray cooler shield	HLBS, SSR
Recirculation spray cooler support	HLBS, SSR
Refueling cavity cofferdam	SSR
Refueling cavity liner	SPB, SSR
Steam generator and reactor coolant pump supports	SSR
Structural steel: beams, columns, plates and trusses	SSR
Sump screen assembly and liner	SSR
Vortex baffles	SSR
Concrete framing	SRE, SSR

Table 2.4-22
Reactor Containment Building
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Crane wall	MB, SHD, SSR
Dome	EN, MB, SHD, SRE, SSR
Drain trenches	DF
Exterior walls (above grade)	EN, MB, SHD, SRE, SSR
Exterior walls (below grade)	EN, FLB, SRE, SSR
Foundation	EN, FLB, MB, SRE, SSR
Fuel transfer canal	SHD, SSR
Instrument pits (including sump pits)	FLB, SSR
Interior walls	MB, SHD, SRE, SSR
Moisture barrier (caulk)	EN
Neutron shields	SHD
Refueling cavity	MB, SSR
Sump	SSR
Slide bearing plates (Lubrite®)	SSR
Unit 2 Reactor Containment Building	
Blowout panels	PR
Containment liner	EN, SPB, SSR
Containment liner and liner penetrations	EN, SPB, SSR
Control rod drive shield	MB, SSR
Control rod drive supports	MB, SSR
Equipment hatch and emergency air lock	EN, SPB, SSR
Fuel transfer canal liner	SSR
Fuel transfer tube	SSR
Fuel transfer tube expansion bellows	SSR
Missile shields	MB
Neutron shield (supplementary)	SHD

Table 2.4-22
Reactor Containment Building
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Neutron shield tank	SHD, SSR
Neutron shield tank shielding	SHD
Penetrations (electrical and mechanical)	SPB, SSR
Personnel air lock	SPB, SSR
Pressurizer supports and safety valve restraints	SSR
Reactor cavity water seal	FLB, SSR
Reactor internals storage stand	SSR
Refueling cavity liner	SPB, SSR
Steam generator and reactor coolant pump supports	SSR
Structural steel: beams, columns, plates and trusses	SSR
Sump screen assembly and liner	SSR
Concrete framing	SRE, SSR
Crane wall	MB, SHD, SSR
Dome	EN, MB, SHD, SRE, SSR
Drain trenches	DF
Exterior walls (above grade)	EN, MB, SHD, SRE, SSR
Exterior walls (below grade)	EN, FLB, SRE, SSR
Foundation	EN, FLB, MB, SRE, SSR
Fuel transfer canal	SHD, SSR
Instrument pits (including sump pits)	FLB, SSR
Interior walls	MB, SHD, SRE, SSR
Moisture barrier (caulk)	EN
Refueling cavity	MB, SSR

**Table 2.4-22
Reactor Containment Building
Components Subject to Aging Management Review
(continued)**

Component Type	Intended Function
Sump	SSR
Slide bearing plates	SSR

2.4.23 Refueling Water Storage Tank and Chemical Addition Tank Pad and Surroundings

Unit 1 Structure Description

The Unit 1 Refueling Water Storage Tank and Chemical Addition Tank Pad is a safety-related, seismic Category I structure. The pad and associated shield wall are approximately 42 by 42 by 25 feet high. It is located west of the Reactor Containment Building.

The two-foot thick pad and the shield wall are constructed of reinforced concrete. The concrete shielding around the refueling water storage tank (RWST) is one-foot thick and will provide adequate protection against damage from failure of the rotating equipment. The only rotating equipment in this area are the chemical addition tank (CAT) pump and the chemical injection pumps. The concrete shielding, metal covering and insulation provide protection of the tank from fire. The distance from the RWST to non-seismic structures in its vicinity and the concrete shielding provide adequate protection for the tank.

The elevation of the refueling water tank enclosure is higher than the level of the PMF.

Unit 2 Structure Description

The pad and surrounding shield wall for the Unit 2 RWST and CAT is a safety-related, seismic Category I structure. The pad and associated shield walls surrounding the tanks are approximately 56 feet by 57 feet by 16 feet high. The tanks are located east of the Unit 2 Safeguards Building.

The tanks are supported on a reinforced concrete foundation mat and the wall is also reinforced concrete. The foundation for the RWST is five feet thick, and the 16-foot high concrete radiation protection shield surrounding the tank has a minimum thickness of one foot.

The elevation of the tank foundation is above the elevation of the PMF.

Unit 1 and Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event); and,
- Provides structural or functional support to safety-related equipment.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 2.7.2.2 6.4.2 9.7.2	Sections 3.8.4.1.13 9.5.1.8.15 Table 3.7B-2

Components Subject to Aging Management Review

Table 2.4-23 lists the component types that require aging management review and their intended functions.

Table 3.5.2-23, *Containments, Structures, and Component Supports – Refueling Water Storage Tank and Chemical Addition Tank Pad and Surroundings – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-23
Refueling Water Storage Tank and Chemical Addition Tank Pad and Surroundings Components Subject to Aging Management Review

Component Type	Intended Function
Unit 1 RWST and CAT Pad and Surroundings	
Tank skirt	SSR
Foundation (tank pad)	SRE, SSR
Shield wall	EN, FB, SHD, SRE, SSR
Unit 2 RWST and CAT Pad and Surroundings	
Tank Skirt	SSR

Table 2.4-23
Refueling Water Storage Tank and Chemical Addition Tank Pad and Surroundings Components Subject to Aging Management Review (continued)

Component Type	Intended Function
Foundation (tank pad, including sump pit)	SRE, SSR
Shield wall	EN, SHD, SRE, SSR

2.4.24 RELAY BUILDING (COMMON)

Structure Description

The Relay Building (also known as the relay house) is part of the Switchyard, and is a nonsafety-related, non-seismic structure. This building contains the control circuits for the Switchyard breakers that are within the scope of license renewal for offsite power recovery following a station blackout (SBO). The Relay Building is a single story structure. An addition was built onto the east end of the original Relay Building circa 1980.

The foundation for the Relay Building and the foundation for the addition are slabs on grade with perimeter footings. The top of the foundation/floor slab is at El. 751'-6". A 4-mil polyethylene vapor barrier underlies the foundation slab for the original Relay Building and a pre-molded membrane vapor barrier underlies the addition's floor slab. An electrical conduit/duct bank encased in concrete runs beneath a portion of the addition's floor slab. A concrete lined catch basin is situated at the northwest corner of the addition. Both the original building and building addition have exterior walls of concrete block masonry with a brick veneer. The roof for the original building is made of pre-cast concrete roof panels. The roof for the addition consists of a lightweight concrete slab supported by metal decking and beams. Both the original building and building addition roof slabs are covered by a roof membrane. The building addition's roof beams are encased with gypsum perlite plaster which serves as fireproofing.

Fire protection piping, in addition to domestic water and sanitary piping, penetrates the original Relay Building within a concrete, subsurface compartment at the northwest corner of the original building. Equipment within the Relay Building is outside the scope of 10 CFR 50.48 required fire protection.

Structure Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for SBO.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
None	Table 9.5-12

Components Subject to Aging Management Review

Table 2.4-24 lists the component types that require aging management review and their intended functions.

Table 3.5.2-24, *Containments, Structures, and Component Supports – Relay Building (Common) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-24
Relay Building (Common)
Components Subject to Aging Management Review

Component Type	Intended Function
Conduit envelope / duct bank	SRE
Roof beams	SRE
Roof decking	SRE
Roof relief vents	SRE
Steel lintels	SRE
Exterior walls (above grade)	SRE
Floor slabs	SRE
Foundation	SRE
Interior walls	SRE
Roof slab	SRE

2.4.25 SAFEGUARDS BUILDING

Unit 1 Structure Description

The Unit 1 Safeguards Building is a safety-related, seismic Category I structure located adjacent to and west of the Unit 1 Reactor Containment Building. The building is a two story structure with a deep Valve Pit, and houses Engineered Safeguards Systems (e.g., the Auxiliary Feedwater System).

The Safeguards Building is supported on a reinforced concrete foundation mat. The floor of the Safeguards Area is provided with baffles, dividing the floor into two sections. Lightweight concrete was used at roof corner fillet details.

The Safeguards Building is connected to the Reactor Containment Building by piping. A shake space is provided to accommodate movement relative to the Containment. The Safeguards Valve Pit is attached directly to the Reactor Containment mat. The Valve Pit is connected to the upper part of the Safeguards Building by pump casements and a shaft. The pump casings and the access shaft are included within the butyl waterproof membrane surrounding the Reactor Containment to provide flood protection up to El. 730 feet.

The elevation of the Safeguards Building is higher than the PMF elevation and not subject to flooding. A sump collects liquid from floor drains. The concrete which surrounds the Safeguards Building is sealed to prevent entry of ground water into the Safeguards Building. The seal membrane also serves to prevent leakage of recirculation water from the Safeguards Area into the earth backfill between the cofferdam and the Containment.

Unit 2 Structure Description

The Unit 2 Safeguards Building is a safety-related, seismic Category I structure. It is approximately 60 feet by 106 feet at its base and 59 feet high. The building provides tornado protection for the engineered safety features pumps, valves and piping penetrations. At El. 718'-6", the Safeguards Building is separated into two separate areas, the north and south. All redundant components and equipment are physically separated in the two individual cubicles. The Safeguards Building is designed to preclude seismic, tornado and missile damage.

The Safeguards Building is a reinforced concrete structure, supported on a reinforced concrete foundation mat. External flood protection is provided up to El. 730 feet.

The Safeguards Building includes a Valve Pit located below, and separated from, the main part of the building. The Valve Pit is joined to the upper portion of the building by pump casements and two shafts. The pit is protected from external flooding by the same waterproof membrane that protects the Containment Building.

Unit 1 and Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event);
- Provides missile barrier (internally or externally generated); and,
- Provides structural or functional support to safety-related equipment.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP and SBO.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 5.2.1 6.4.3 9.7.2	Sections 3.6B.1.3.4.2 3.8.4.1.2 Figure 2.4-17 Figure 2.5.4-41 Figure 3.8-5

Components Subject to Aging Management Review

Table 2.4-25 lists the component types that require aging management review and their intended functions.

Table 3.5.2-25, *Containments, Structures, and Component Supports – Safeguards Building – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-25
Safeguards Building
Components Subject to Aging Management Review

Component Type	Intended Function
Unit 1 Safeguards Building	
Pump casements	EN, FLB
Exterior walls (above grade)	EN, FB, MB, SNS, SRE, SSR
Exterior walls (below grade)	EN, FB, FLB, SNS, SRE, SSR
Floor slabs (including baffles)	FB, SNS, SRE, SSR
Foundation mat (includes sump pit)	EN, FB, FLB, SNS, SRE, SSR
Interior walls	EN, FB, SNS, SRE, SSR
Roof slab	EN, FB, MB, SSR, SRE
Roof slab (Valve Pit)	EN, FLB, SNS, SRE, SSR
Vent ducts	EN, SNS, SRE, SSR
Unit 2 Safeguards Building	
Pump casements	EN, FLB
Beams and columns	SNS, SRE, SSR
Exterior walls (above grade)	EN, FB, MB, SNS, SRE, SSR
Exterior walls (below grade)	EN, FB, FLB, SNS, SRE, SSR
Floor slabs	FB, SNS, SRE, SSR
Foundation mat (includes sump pit)	EN, FB, FLB, SNS, SRE, SSR
Interior walls	EN, FB, SNS, SRE, SSR
Roof slab	EN, FB, MB, SSR, SRE
Roof slab (Valve Pit)	EN, FLB, SNS, SRE, SSR

2.4.26 SERVICE BUILDING

Unit 1 Structure Description

The Unit 1 Service Building is a safety-related, seismic Category I structure which protects safety-related systems and components. The seismic Category I portions include: part of the main control room, emergency switchgear and relay room, battery rooms, cable tray area, process room, and air conditioning equipment room for the main control room. The Service Building is a four story structure with mezzanine levels, approximately 135 by 275 by 88 feet high. It is located adjacent to and south of the Unit 1 Turbine Building.

The Service Building foundation consists of a continuous mat of reinforced concrete founded on undisturbed gravel or compacted granular fill. The upper levels are constructed of conventional steel framing, while the areas below the steel superstructure are constructed of reinforced concrete designed for seismic and tornado loads. Roofing consists of a built-up membrane over steel decking supported by steel framing, and the elevation of the roof varies. Concrete floor slabs are supported by steel or concrete framing and can accommodate a collapse of the steel superstructure. Housing for a large structural steel and sheet metal air intake and radiator cooler is supported on the west end of the roof. The exterior of the Service Building is either concrete or protected metal fluted siding. The Service Building is waterproofed so that it is unaffected by floods to the PMF elevation. Equipment below the PMF elevation and essential for maintaining safe shutdown are in watertight and missile-proof concrete structures.

The Unit 1 portion of the main control room is located on the ground floor at the east end of the building. The Unit 2 portion of the main control room is located in the Unit 2 Control Building (Section 2.4.7). A two-foot thick concrete wall separates the main control room from other ground floor areas. The control room is within a missile-proof concrete structure which is independently air-conditioned and protected against airborne radioactive contaminants.

Structural steel beams below the cable tray area (cable spreading room) have been coated with a fireproof material to achieve a 1.5 hour fire rated barrier.

A vertical pipe chase extending from El. 698'-6" to the roof at El. 775'-6" is situated in the northwest corner of the building. This vertical pipe chase contains main steam and feedwater piping.

Unit 2 Structure Description

The Unit 2 Service Building is a safety-related, seismic Category I structure housing various safety-related equipment. The building has four stories and is approximately 54 by 186 by 70 feet high.

The roof and portions of the walls of the top story are steel framed with metal decking and siding, respectively. The remainder of the structure is reinforced concrete and has a reinforced concrete foundation mat. The concrete walls and slabs provide protection against tornado and tornado-generated missiles. The steel framing is non-Category I and is not designed for seismic or tornado loads.

External flood protection is provided up to the PMF. Except for the battery room ductwork which is seismic Category I, all other equipment at El. 760'-6" is non-seismic. If non-seismic Category I portions of the Service Building fail, no adverse effects on adjacent seismic Category I structures or components will occur.

Unit 1 and Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event);
- Provides missile barrier (internally or externally generated); and,
- Provides structural or functional support to safety-related equipment.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP and SBO.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections	Sections
1.2.3	2.4.2.3.2
2.3.3	3.6B.1.3.4.3
2.3.10	3.8.4.1.7
2.7.2.2	Figure 2.4-17
2.7.4	Figure 2.5.4-41
7.8.1	
9.7.2	

Components Subject to Aging Management Review

Table 2.4-26 lists the component types that require aging management review and their intended functions.

Table 3.5.2-26, *Containments, Structures, and Component Supports – Service Building – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-26
Service Building
Components Subject to Aging Management Review

Component Type	Intended Function
Unit 1 Service Building	
Control room ceiling	SNS, SSR
Floor and roof decking	EN, SNS, SRE, SSR
Metal siding	EN, SNS, SRE, SSR
Structural steel: beams, columns, plates and trusses	SNS, SRE, SSR
Beams and columns	SNS, SRE, SSR
Exterior walls (above grade)	EN, FB, MB, SNS, SRE, SSR
Exterior walls (below grade)	EN, FB, FLB, SNS, SRE, SSR
Floor slabs	FB, MB, SNS, SRE, SSR
Foundation mat (includes sump pit)	EN, FB, FLB, SNS, SRE, SSR
Interior walls	EN, FB, SNS, SRE, SSR
Main control room envelope	EN, FB, MB, SHD, SPB, SNS, SRE, SSR
Pipe chase (northwest corner)	EN, FB, HLBS, MB, SNS, SRE, SSR
Unit 2 Service Building	
Blowout panel	PR
Metal siding	EN, SNS, SRE, SSR
Roof decking	EN, SNS, SRE, SSR
Structural steel: beams, columns, plates and trusses	SNS, SRE, SSR
Beams and columns	SNS, SRE, SSR

Table 2.4-26
Service Building
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Exterior walls (above grade)	EN, FB, MB, SNS, SRE, SSR
Floor slabs	FB, MB, SNS, SRE, SSR
Foundation mat	EN, FB, FLB, SNS, SRE, SSR
Interior walls	EN, FB, SNS, SRE, SSR
Pipe and vent chases	EN, FB, HLBS, MB, SNS, SRE, SSR

2.4.27 SOLID WASTE BUILDING (UNIT 1 ONLY)

Unit 1 Structure Description

The Unit 1 Solid Waste Building is a safety-related, seismic Category I structure. It houses the coolant recovery tanks and solid waste processing equipment and is 40 by 120 by 47 feet high. It is located directly east of the Unit 1 Auxiliary Building.

The Solid Waste Building is constructed of reinforced concrete walls. The two coolant recovery tanks are situated at the north and south ends of the building. The tops of their foundations (i.e., the main floor slab) are four feet thick. Near the center of the building, the foundation extends down to enclose pipe and duct penetrations in this area. Structural steel framing supports the steel roof decking. The roof slab is 12 inches thick; lightweight concrete was used at roof corner fillet details.

A sump is located in the Solid Waste Building. However, there are no equipment or floor drains in the building. The elevation of the building is higher than the PMF elevation.

Unit 1 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event); and,
- Provides structural or functional support to safety-related equipment.

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3): None

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 9.2.1 9.7.2	Not applicable

Components Subject to Aging Management Review

Table 2.4-27 lists the component types that require aging management review and their intended functions.

Table 3.5.2-27, *Containments, Structures, and Component Supports – Solid Waste Building (Unit 1 only) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-27
Solid Waste Building (Unit 1 only)
Components Subject to Aging Management Review

Component Type	Intended Function
Roof decking	EN, SNS, SSR
Shield plates	EN, SNS, SSR,
Structural steel: beams, columns, plates and trusses	SNS, SSR
Exterior walls (above grade)	EN, MB, SNS, SSR
Exterior walls (below grade)	EN, FLB, SNS, SSR
Foundation (at grade)	EN, SNS, SSR
Foundation (includes sump pit)	EN, FLB, SNS, SSR
Interior walls	EN, MB, SNS, SSR
Platform at El. 770'-6"	SNS, SSR
Roof slab	EN, SNS, SSR

2.4.28 SOUTH OFFICE AND SHOPS BUILDING (COMMON)

Structure Description

The South Office and Shops Building is a seven story, nonsafety-related, seismic Category II steel frame structure located adjacent to the southeast corner of the Unit 2 Turbine Building. The South Office and Shops Building houses offices and shops for various engineering and maintenance groups that support both plant units. The Unit 2 Auxiliary Boiler Room is contained in the South Office and Shops Building, but there are no in-scope components located in the Auxiliary Boiler Room. The South Office and Shops Building is designed not to collapse onto the Turbine Building under tornado or seismic loads (the Turbine Building could otherwise potentially collapse onto safety-related structures). Therefore, only the major structural building systems (column and floor steel, bracing, roof deck and slab, fasteners and anchorage) required for overall structural integrity were subject to aging management review.

Structure Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2):

- Prevent damage to adjacent structures that could in turn adversely impact safety-related structures due to collapse during a seismic event or tornado.

10 CFR 54.4(a)(3): None

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
None	None

Components Subject to Aging Management Review

Table 2.4-28 lists the component types that require aging management review and their intended functions.

Table 3.5.2-28, *Containments, Structures, and Component Supports – South Office and Shops Building (Common) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-28
South Office and Shops Building (Common)
Components Subject to Aging Management Review

Component Type	Intended Function
Metal siding and roofing	SNS
Structural steel: beams, columns, plates and trusses	SNS
Foundation	SNS
Roof slab	SNS

2.4.29 STEAM GENERATOR DRAIN TANK STRUCTURE (UNIT 1 ONLY)

Structure Description

The Unit 1 Steam Generator Drain Tank Structure (also called the liquid hold tank) is a non-safety related, non-seismic structure. It is a triangular shaped, reinforced concrete building that is internally partitioned to form two separate stainless steel lined tanks. An integral, reinforced concrete roof provides total enclosure. The roof has a perimeter handrail and several access hatches. The structure is located in a wedge-shaped area between the Reactor Containment and Decontamination Buildings. The tank structure was a late addition to the plant, and was built primarily on an existing drum storage pad concrete slab, but extends into the Decontamination Building's foundation slab. The tanks hold water during certain plant evolutions for treatment as liquid waste prior to discharge. Piping for fill, drain and level indication penetrates the wall facing the Reactor Containment Building. The structure is in-scope because of its proximity to the Reactor Containment, Fuel Pool, and Decontamination Buildings.

Structure Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2):

- Prevent damage to adjacent structures that could, in turn, adversely impact safety related structures due to collapse during a seismic event or tornado.

10 CFR 54.4(a)(3): None

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Section 11.2.4	Not applicable

Components Subject to Aging Management Review

Table 2.4-29 lists the component types that require aging management review and their intended functions.

Table 3.5.2-29, *Containments, Structures, and Component Supports – Steam Generator Drain Tank Structure (Unit 1 only) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-29
Steam Generator Drain Tank Structure (Unit 1 only)
Components Subject to Aging Management Review

Component Type	Intended Function
Exterior walls (above grade)	SNS
Foundation	SNS
Interior walls	SNS
Roof slab	SNS

2.4.30 SWITCHYARD (COMMON)

Structure Description

The Switchyard is a nonsafety-related, non-seismic structure located south of the plant. The Switchyard contains Duquesne Light Company (DLCo) system circuit breakers and relays that connect BVPS to the DLCo grid. The Switchyard contains 138kV and 345kV Switchyards, and forms a transmission switching point for the DLCo system. Lines converge on the Switchyard via widely separated routes. The two 138kV lines from the Switchyard to the plant are each on separate towers. The Unit 1 main transformer and the Unit 2 main transformer are connected to the Switchyard via transmission lines supported by towers.

Structural components associated with the Switchyard include towers and poles supporting electrical transmission lines. Although the towers and poles are located outside of the Switchyard, they are considered Switchyard structures since they are connected to Switchyard equipment via overhead power lines.

Some Switchyard components are owned by FirstEnergy Nuclear Generation Corp., and some are owned by DLCo. DLCo was a former owner, operator and licensee.

Structure Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for SBO.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
None	None

Components Subject to Aging Management Review

Table 2.4-30 lists the component types that require aging management review and their intended functions.

Table 3.5.2-30, *Containments, Structures, and Component Supports – Switchyard (Common) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-30
Switchyard (Common)
Components Subject to Aging Management Review

Component Type	Intended Function
Transmission towers	SRE
Transmission tower foundations	SRE
Transmission poles	SRE

2.4.31 TURBINE BUILDING

Unit 1 Structure Description

The Unit 1 Turbine Building is a nonsafety-related, non-seismic structure located adjacent to and north of the Unit 1 Service Building and adjacent to and east of the Unit 1 Water Treatment Building. The Turbine Building superstructure is designed so that it will not collapse and endanger protected structures and systems. The building houses secondary plant equipment and equipment that supports fire protection functions.

The foundation/basement floor slab is below grade. Steel framing supports the mezzanine and operating floor slabs and roof decking. The Turbine Building has a built-up roof membrane on steel decking and is clad with insulated metal fluted siding.

Unit 2 Structure Description

The Unit 2 Turbine Building is a nonsafety-related, non-seismic structure, enclosed with insulated metal siding and roof deck, and is approximately 135 by 275 by 115 feet high. It is located adjacent to and south of the Auxiliary and Service Buildings. The Turbine Building houses secondary plant equipment and equipment that supports fire protection functions.

The ground floor is a reinforced concrete slab. The building and major equipment, including the turbine generator, are supported on reinforced concrete spread footings and foundation mats. The Turbine Building is steel framed, and has a built-up roof membrane on steel decking. The building is clad with insulated metal fluted siding, which is designed to blow-off under tornado loading to reduce wind loads on the superstructure. The ground floor slab is slightly above the PMF elevation. The mezzanine floor slab is at El. 752'-6" and the operating floor slab is at El. 774'-6".

Circulating water system piping expansion joints are located in the Turbine Building. In the event of internal flooding from a circulating water expansion joint rupture, the Turbine Building side panels would release and discharge the water into the yard area before the water level could reach El. 735'-6" and potentially affect other buildings or equipment.

Unit 1 and Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 2.3.3 2.7.2.2 2.7.3.2.3	Sections 3.8.4.1.19 10.4.5.3 Figure 2.4-17 Figure 2.5.4-41

Components Subject to Aging Management Review

Table 2.4-31 lists the component types that require aging management review and their intended functions.

Table 3.5.2-31, *Containments, Structures, and Component Supports – Turbine Building – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-31
Turbine Building
Components Subject to Aging Management Review

Component Type	Intended Function
Unit 1 Turbine Building	
Floor decking	SRE
Metal siding	SRE
Roof decking	SRE
Structural steel: beams, columns, plates and trusses	SRE
Exterior walls (below grade)	SRE
Foundation (includes sump pit)	SRE

Table 2.4-31
Turbine Building
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Floor slabs	SRE
Interior walls	SRE
Unit 2 Turbine Building	
Floor decking	SRE
Metal siding	SRE
Roof decking	SRE
Structural steel: beams, columns, plates and trusses	SRE
Foundation (includes sump pit)	SRE
Floor slabs	SRE
Interior walls	SRE

2.4.32 VALVE PIT

Unit 1 Structure Description

The Unit 1 Valve Pit is a safety-related, seismic Category I structure, approximately 13 feet by 19.5 feet by 14 feet high. The Valve Pit, which houses safety-related equipment, is a reinforced concrete, subsurface structure.

The Valve Pit is divided into two separate compartments. Each compartment has its own manhole for access. A sump pit is situated at the bottom of each compartment.

Unit 2 Structure Description

The two Unit 2 Service Water Valve Pits are safety-related, seismic Category I structures. Both are subsurface structures. One is approximately 14 by 20 by 15 feet high and is adjacent to the Unit 2 Safeguards Building. The second is 24 by 36 by 18 feet high and is northwest of the Fuel and Decontamination Buildings. The Valve Pits house safety-related valves for service water piping running outside of the major buildings.

The Service Water Valve Pits are supported on reinforced concrete foundation mats and have reinforced concrete walls and roofs. The Valve Pits provide tornado protection for their contents, and have external flood protection up to the PMF elevation.

The Valve Pit northwest of the Fuel and Decontamination Buildings consists of two, separate compartments, each with a sump pit. Access to the Valve Pit is provided by two doors (one per compartment) associated with an aboveground concrete enclosure located over the Valve Pit. The enclosure has two sealed plugs that provide access for equipment removal.

Access to the Valve Pit adjacent to and north of the Safeguards Building is via removable slabs, which are sealed.

Unit 1 and Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1):

- Provides flood protection barrier (internal and external flooding event);
- Provides structural or functional support to safety-related equipment; and,
- Provides missile barrier (internally or externally generated) (Unit 2 only).

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP (Unit 2 only).

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Sections 9.9.2 9.16.2	Sections 3.8.4.1.9 3.6B.1.3.4.2 Figure 2.4-17

Components Subject to Aging Management Review

Table 2.4-32 lists the component types that require aging management review and their intended functions.

Table 3.5.2-32, *Containments, Structures, and Component Supports – Valve Pit – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-32
Valve Pit
Components Subject to Aging Management Review

Component Type	Intended Function
Unit 1 Valve Pit	
Foundation mat	EN, FLB, SSR
Exterior walls (below grade)	EN, FLB, SSR
Interior walls	EN, SSR
Roof slab	EN, SSR
Unit 2 Valve Pits	
Ceiling plates	EN, SSR
Foundation mat (includes sump pit)	EN, FLB, SSR
Exterior walls (above grade)	MB

Table 2.4-32
Valve Pit
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Exterior walls (below grade)	EN, FB, FLB, SSR
Removable slab covers	EN, MB, SSR
Roof slab	EN, MB, SSR

2.4.33 WASTE HANDLING BUILDING (UNIT 2 ONLY)

Unit 2 Structure Description

The Waste Handling Building is a nonsafety-related, seismic Category II structure. It contains no safety-related equipment. It is located adjacent to, and west of, the Turbine Building. It is a four-story, plus basement, structure approximately 40 by 112 by 77 feet high.

The Waste Handling Building is supported on a reinforced concrete foundation mat. The roof and walls of the top two stories are steel framed with metal siding and roof deck. The remainder of the structure is reinforced concrete.

Unit 2 Structure Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2):

- Prevents damage to adjacent safety related structures due to collapse during a seismic event.

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Not applicable	Sections 3.8.4.1.16 3.6B.1.3.4.3

Components Subject to Aging Management Review

Table 2.4-33 lists the component types that require aging management review and their intended functions.

Table 3.5.2-33, *Containments, Structures, and Component Supports – Waste Handling Building (Unit 2 only) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-33
Waste Handling Building (Unit 2 only)
Components Subject to Aging Management Review

Component Type	Intended Function
Metal siding	SNS, SRE
Roof decking	SNS, SRE
Structural steel: beams, columns, plates and trusses	SNS, SRE
Exterior walls (above grade)	SNS, SRE
Exterior walls (below grade)	SNS, SRE
Floor slabs	SNS, SRE
Foundation (includes sump pit)	SNS, SRE
Interior walls	SNS, SRE

2.4.34 WATER TREATMENT BUILDING (UNIT 1 ONLY)

Unit 1 Structure Description

The Unit 1 Water Treatment Building is a nonsafety-related, non-seismic, two-story structure, adjacent to and west of the Turbine Building. The top floor of the Water Treatment Building is open to the Turbine Building. It houses equipment for filtering, demineralizing, and chemically treating river water. Water treatment is not required for safe shutdown of the reactor.

The top of the building's foundation/ the ground floor slab is at El. 707'-6". It was constructed on compacted sand and gravel. Grade elevations in the vicinity of the Water Treatment Building vary. Upon construction of the foundation/ ground floor slab, the area around the building was backfilled. Structural steel framing supports the upper floor slab at El. 735'-6" and the roof at an approximate elevation of 753 feet. Roofing consists of an insulated built-up membrane on steel decking. The building is clad in insulated metal fluted siding.

Unit 1 Structure Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for FP.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
None	Not applicable

Components Subject to Aging Management Review

Table 2.4-34 lists the component types that require aging management review and their intended functions.

Table 3.5.2-34, *Containments, Structures, and Component Supports – Water Treatment Building (Unit 1 only) – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-34
Water Treatment Building (Unit 1 only)
Components Subject to Aging Management Review

Component Type	Intended Function
Metal siding	SRE
Roof decking	SRE
Structural steel: beams, columns, plates and trusses	SRE
Exterior walls (below grade)	SRE
Foundation	SRE
Floor slabs	SRE

2.4.35 YARD STRUCTURES

Structure Description

The Unit 1, Unit 2 and common Yard Structures include slag pits and concrete (fire) walls for the Unit 1 and Unit 2 offsite power supply transformers, in-scope electrical equipment, and their supports and foundations, respectively. Outside transformers are not within the scope of 10 CFR 50.48 required fire protection; however, the concrete (fire) walls are included within the scope of 10 CFR 50.48 for license renewal.

BVPS credits outdoor lighting (with backup power provided by the Security Diesel Generator) for access/egress related to Appendix R (Fire Protection) and station blackout. Yard Structures that support this function are lighting poles.

Structure Intended Functions

10 CFR 54.4(a)(1): None

10 CFR 54.4(a)(2): None

10 CFR 54.4(a)(3):

- Provides structural or functional support required to meet the Commission's regulations for SBO.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
None	Table 9.5-12

Components Subject to Aging Management Review

Table 2.4-35 lists the component types that require aging management review and their intended functions.

Table 3.5.2-35, *Containments, Structures, and Component Supports – Yard Structures – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-35
Yard Structures
Components Subject to Aging Management Review

Component Type	Intended Function
Lighting poles	SRE
Lighting pole and transformer foundations	SRE

2.4.36 BULK STRUCTURAL COMMODITIES

Bulk Structural Commodities Description

Bulk Structural Commodities are structural component groups that support in-scope structures and mechanical/electrical systems. They are common to multiple SSCs, and share material and environment properties which allow a common program or inspection to manage their aging effects.

Structural commodities that are unique to a specific structure are evaluated with that structure.

The evaluation of Bulk Structural Commodities covered structural component and commodity types such as:

- Cranes, hoists and miscellaneous monorails;
- Service ladders, platforms and stairs required for general access, equipment support and maintenance activities;
- Structural steel components which are common to in-scope systems and structures such as anchorage, baseplates, cable trays and conduits, equipment supports, framing, grating, panels and enclosures, and piping supports;
- Structural concrete components which are common to in-scope systems and structures such as equipment pads, floor curbs and hatches;
- Elastomeric components which are common to in-scope systems and structures such as compressible joints and seals, roof membranes and waterstops;
- Fire barriers which are common to in-scope systems and structures such as fire doors, penetration fire seals, fireproofing, fire stops and fire wraps; and,
- Miscellaneous materials common to in-scope systems and structures such as thermal insulation.

The Bulk Structural Commodities are sorted by the following categories:

- Steel and other metals;
- Concrete;
- Elastomers;
- Fire Barriers;
- Miscellaneous materials; and,
- Threaded fasteners.

Bulk Structural Commodities Intended Functions

The component types evaluated as Bulk Structural Commodities support in-scope structures. The intended functions for in-scope structures are listed with the appropriate structure in Sections 2.4.1 through 2.4.34.

UFSAR References

Additional structure details are included in the UFSAR Sections identified below:

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
None	None

Components Subject to Aging Management Review

Table 2.4-36 lists the component types that require aging management review and their intended functions.

Table 3.5.2-36, *Containments, Structures, and Component Supports – Bulk Structural Commodities – Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.4-36
Bulk Structural Commodities
Components Subject to Aging Management Review

Component Type	Intended Function
Steel and Other Metals	
Anchorage / embedments	SNS, SRE, SSR
Cable trays and conduits	EN, SNS, SRE, SSR
Cable tray and conduit supports	SNS, SRE, SSR
Component and piping supports (ASME class 1, 2 and 3)	SNS, SRE, SSR
Crane girders and rails	SNS, SRE, SSR
Damper framing (in-wall)	FB, SNS, SRE, SSR
Electrical and instrument panels and enclosures	EN, SNS, SRE, SSR

Table 2.4-36
Bulk Structural Commodities
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Equipment component supports	SNS, SRE, SSR
Fire doors	FB, FLB, SNS, SRE, SSR
Flexible conduit	SNS, SRE, SSR
Flood, pressure and specialty doors	FLB, MB, SPB, SNS, SRE, SSR
Floor plates	EN, SNS, SRE, SSR
Framing for floor and wall sections	SNS, SRE, SSR
Grating, ladders, platforms and stairs	SNS, SRE
Grating, ladder, platform and stair supports	SNS, SRE
Hatches (hatch covers)	EN, FB, FLB, MB, SPB, SNS, SRE, SSR
HELB barriers	HLBS, PW, SNS, SSR
HVAC duct supports	SNS, SRE, SSR
Instrument racks and frames	SNS, SRE, SSR
Louvers and vents	RP, SNS, SRE, SSR
Penetrations (electrical and mechanical, non containment pressure boundary)	EN, FLB, SPB, SNS, SRE, SSR
Pipe supports	SNS, SRE, SSR
Shake space / expansion joint covers	EN, SRE, SSR
Sump liners	EN, SNS, SRE, SSR
Thermal insulation (metallic)	SNS, SRE, SSR
Tube tracks	SNS, SRE, SSR
Tube track and instrument line supports	SNS, SRE, SSR
Vent panels	PR, SNS, SRE, SSR
Concrete	
Duct lines and manholes	EN, FB, SNS, SRE, SSR
Equipment pads	FLB, SNS, SRE, SSR
Flood curbs	FLB, SNS, SRE, SSR

Table 2.4-36
Bulk Structural Commodities
Components Subject to Aging Management Review
(continued)

Component Type	Intended Function
Hatches	EN, FB, FLB, MB, SHD, SNS, SPB, SRE, SSR
Elastomers	
Building pressure boundary seals and sealants	SNS, SPB, SSR
Compressible joints and seals	EXP, FLB, SNS, SPB
Roof membrane	FLB, SNS
Waterproofing membrane	FLB, SNS
Waterstops	FLB
Fire Barriers	
Fire barriers	FB, SNS, SRE, SSR
Fireproofing	FB, SNS
Fire stops	EN, FB, FLB, SPB, SNS, SRE, SSR
Fire wraps	FB, SNS, SRE,SSR
Miscellaneous Materials	
Thermal insulation (non-metallic)	SNS, SRE, SSR
Threaded Fasteners	
Anchor bolts and structural bolts	SNS, SRE, SSR
Anchor bolts and structural bolts (ASME class I, 2, 3 support bolting)	SNS, SRE, SSR
Expansion anchors	SNS, SRE, SSR

2.5 SCOPING AND SCREENING RESULTS: ELECTRICAL AND INSTRUMENTATION AND CONTROLS SYSTEMS

Description

The scoping method used at BVPS includes all plant electrical and I&C components. Electrical and I&C components in mechanical systems were also included in the evaluation of electrical systems. Including components beyond those actually required by the license renewal rule is a conservative scoping method, considered an "encompassing" or "bounding" approach. This scoping method, when used with the plant spaces approach for the review of plant environments, eliminates the need to identify each unique component and its specific location, and assures that components are not improperly excluded from an aging management review. The method is consistent with NUREG-1800, but is different from the methods used for mechanical systems and structures.

The electrical and I&C integrated plant assessment 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 integrated plant assessment screening, some commodity groups were removed from further review.

Reviews of BVPS systems, structures, and components followed traditional mechanical, structural, and electrical engineering discipline division lines. If an in-scope component carries electrical current, and it is not specifically screened out, then it requires an electrical aging management review. If the component supports, protects, or restrains the movement of electrical equipment subject to aging management review, then it requires a structural aging management review. Enclosures, cabinets, panels that hold and protect electrical components (e.g., switchgear enclosures, connection cabinets, and power panel boards), and items that support electrical components (e.g., cable trays, conduit, and cable trenches) are included in the structural aging management review. Most electrical components with a pressure boundary function are included in the mechanical aging management reviews. The electrical portions of power and control penetration assemblies are included in the electrical aging management review, and the portions associated with the leak-tight radiological control barrier are included in the structural AMR.

After identifying passive commodity groups in accordance with the guidance of NEI 95-10 [Reference 1.3-7], components that are subject to periodic replacement were also screened out. Commodity groups and components were then evaluated to identify whether specific electrical and I&C commodity groups and specific components perform a license renewal intended function, thus determining whether they are subject to aging management review.

In addition to the plant electrical systems, certain Switchyard components required to restore offsite power following a station blackout were 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)[Reference 1.3-1]. The evaluation boundaries of the offsite power system are described below.

The purpose of the offsite power system (Unit 1: Figure 2.5-1, and Unit 2: Figure 2.5-2) is to provide the electrical interconnection between BVPS and the offsite transmission network. The system also provides the electrical interconnections between the offsite network and the station auxiliary buses, as well as other buildings and facilities on site.

UFSAR References

Additional system details are included in the UFSAR Sections identified below.

BVPS Unit 1 UFSAR	BVPS Unit 2 UFSAR
Chapter 7	Chapter 7
Chapter 8	Chapter 8

Evaluation Boundaries

Plant electrical and I&C systems are included in the scope of license renewal as are electrical and I&C components in mechanical systems.

For BVPS, recovery of offsite power following station blackout is dependent upon medium-voltage insulated cable, Switchyard bus, transmission conductors, and high voltage insulators that connect the plant electrical distribution system to the offsite AC power source via the station service transformers. Switchyard bus, transmission conductors, high-voltage insulators, and connections connecting Switchyard breakers and station service transformers are subject to aging management review. Medium-voltage cables and connections, connecting station service transformers and nonsafety buses are subject to aging management review. Medium-voltage cables and connections connecting nonsafety buses to the safety buses are subject to aging management review.

Components Subject to Aging Management Review

As discussed in Section 2.1.2.3.1, BVPS 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 structures and components.

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 not subject to 10 CFR 50.49 EQ requirements;
- 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 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 (2kV to 35kV) cables (e.g., installed underground in conduit or direct buried) not subject to 10 CFR 50.49 EQ requirements;
- Metal enclosed bus (non-segregated bus) - bus/connections (Unit 2 only);
- Metal enclosed bus (non-segregated bus) - enclosures assemblies (Unit 2 only);
- Metal enclosed bus (non-segregated bus) - insulation / insulators (Unit 2 only);
- Switchyard bus (Switchyard bus for SBO recovery) and connections (Unit 1 only);
- Transmission conductors (transmission conductors for SBO recovery) and connections; and,
- Uninsulated ground conductors.

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; and,
- Uninsulated ground conductors limit equipment damage and provide personnel protection 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, *Electrical and Instrumentation and Controls Components—Summary of Aging Management Evaluation*, provides the results of the aging management review.

Table 2.5-1
Electrical and Instrumentation and Controls Systems
Components Subject to Aging Management Review

Structure and/or Component / Commodity	Intended Function
Cable connections (metallic parts)	CE
Electrical cables and connections not subject to 10 CFR 50.49 EQ requirements	CE
Electrical cables and connections not subject to 10 CFR 50.49 EQ requirements used in instrumentation circuits	CE
Electrical connections not subject to 10 CFR 50.49 EQ requirements exposed to borated water leakage	CE
Fuse holders - insulation material	CE
High voltage insulators	INE
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
Metal enclosed bus (non-segregated bus), bus / connections (Unit 2 only)	CE
Metal enclosed bus (non-segregated bus), enclosure assemblies (Unit 2 only)	SSR
Metal enclosed bus (non-segregated bus), insulation /insulators (Unit 2 only)	INE
Switchyard bus (Switchyard bus for SBO recovery) and connections (Unit 1 only)	CE
Transmission conductors (transmission conductors for SBO recovery) and connections	CE

Figure 2.5-1
BVPS Unit 1 Offsite Power Recovery Diagram

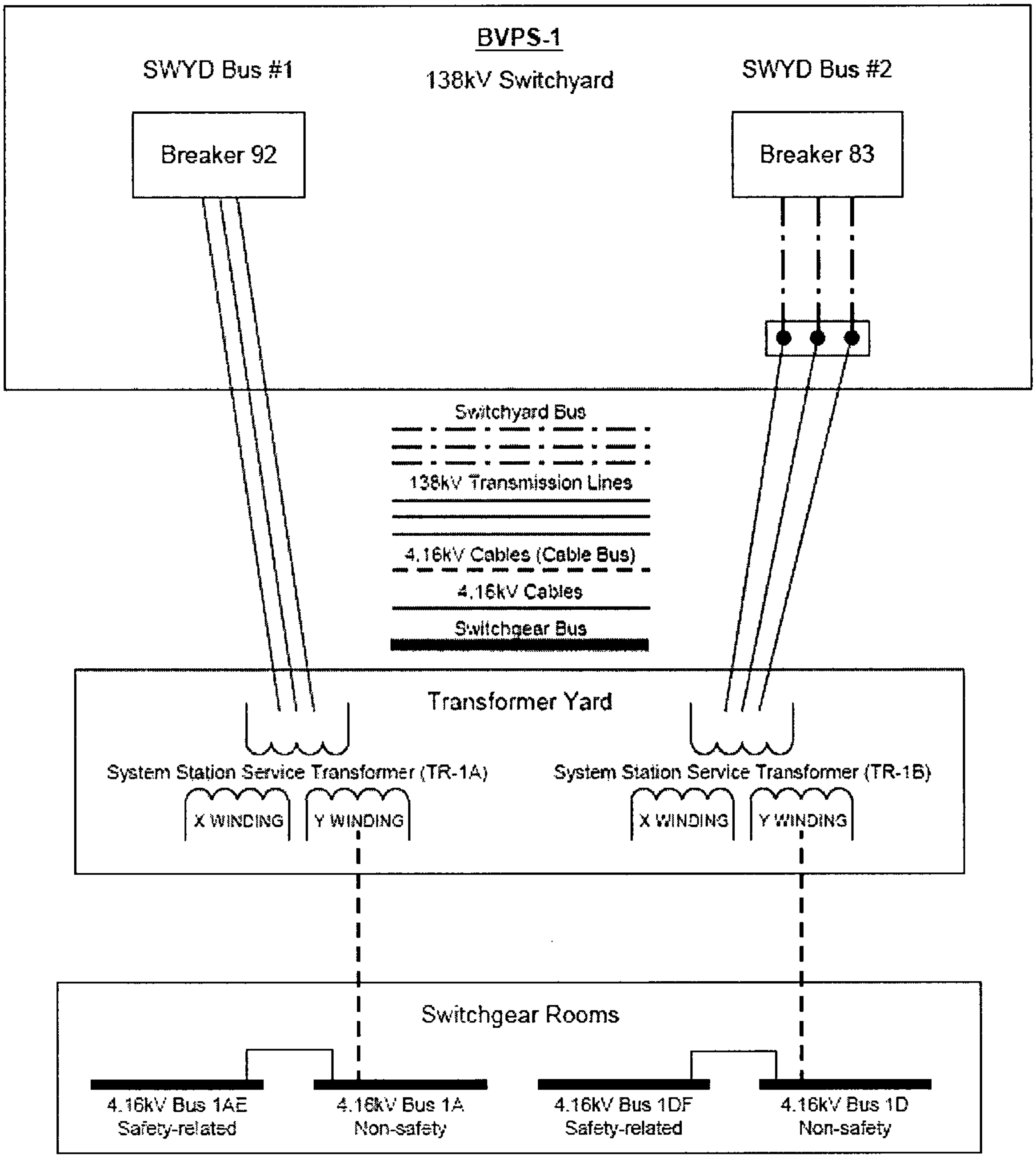
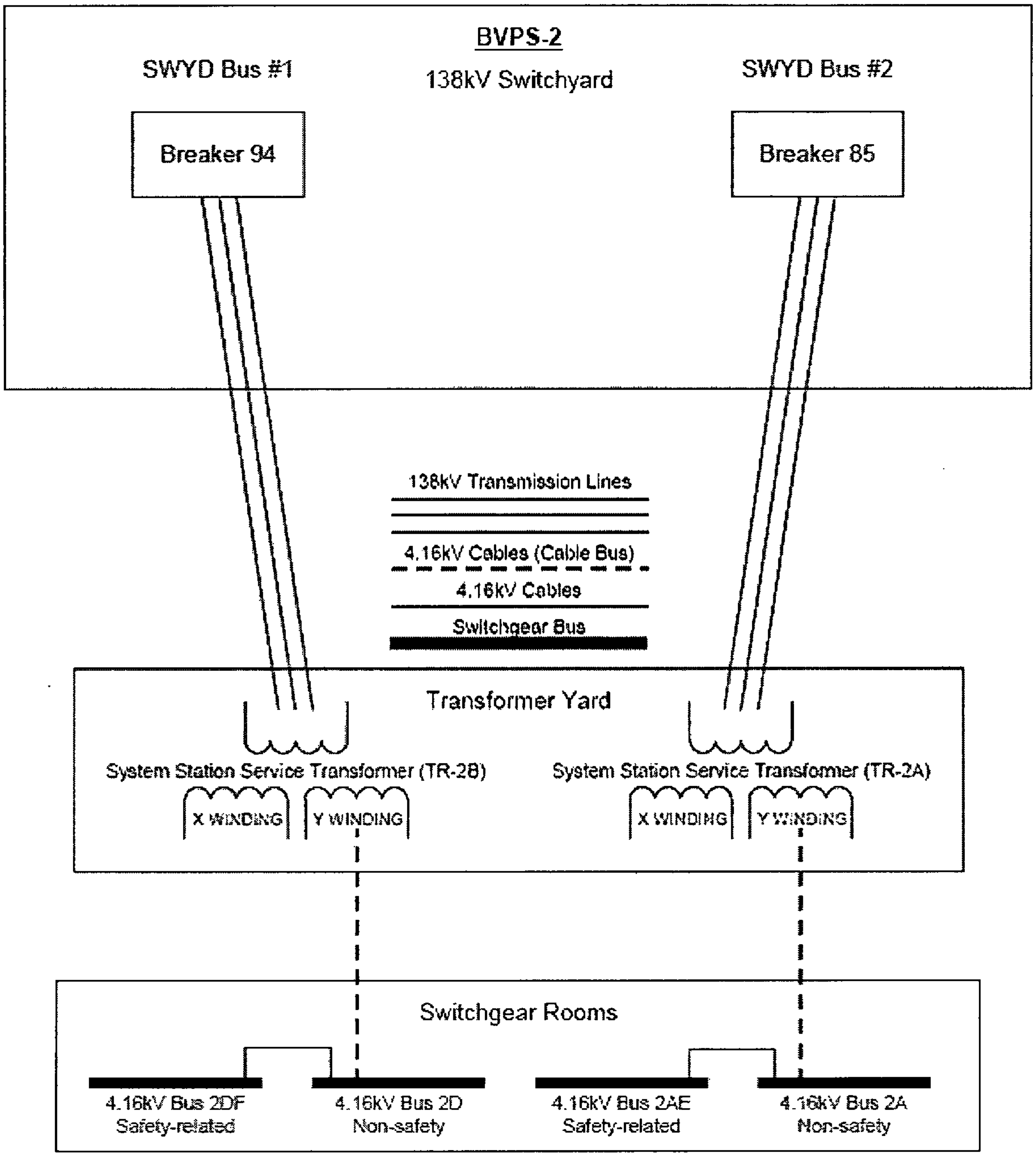


Figure 2.5-2
BVPS Unit 2 Offsite Power Recovery Diagram



3.0 AGING MANAGEMENT REVIEW RESULTS

This section provides a discussion of the format and content of the tabulated results of the aging management reviews 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, electrical, and structural service environments, respectively, used in the aging management review to determine aging effects requiring management. BVPS Unit 1 and Unit 2 are constructed of similar materials with similar environments. Therefore, the mechanical system and component information presented in this application typically applies to both units, and no unit-specific identifier is listed. However, design differences exist between Unit 1 and Unit 2. Those design differences that impact aging management for each unit are identified by a unit-specific designator ("(Unit 1 only)" or "(Unit 2 only)") in the appropriate section of this application. A "(Common)" designator is listed for cases where a single system, structure, or component is used by both units. Structures information is presented separately by unit.

Results of the aging management reviews are presented in two types of tables as described in the following Sections.

3.0.1 TABLE DESCRIPTION

NUREG-1801 [Reference 1.3-5] 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 period of extended 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. NUREG-1801 also contains recommendations on specific areas for which existing programs should be enhanced for license renewal.

To take full advantage of NUREG-1801, aging management review results have been compared with information set forth in the tables of NUREG-1801. Results of that comparison are provided in the following two table types: Table 3.x.1, also referred to as Table 1, and Table 3.x.2-y, also referred to as Table 2.

- **Table 3.x.1** where

  3 indicates the table pertaining to a Chapter 3 aging management review,

  x indicates the table number from NUREG-1801, 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 aging management reviews.

- **Table 3.x.2-y** 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, and

  y indicates the system table number.

  For example, within the Reactor Coolant System section, the aging management review results for the Reactor Vessel are presented in Table 3.1.2-1, and the results for the Reactor Vessel Internals are in Table 3.1.2-2. In the Engineered Safety Features section, the Containment Depressurization System results are presented in Table 3.2.2-1, and the Residual Heat Removal System results are in Table 3.2.2-2. For ease of discussion, these table types will hereafter be referred to as *Table 2*. These tables present the results of the aging management reviews.

3.0.1.1 Table 1

The purpose of Table 1 is to provide a summary comparison of how the aging management review results align with the corresponding table of NUREG-1801, Volume 1. The Table 1s 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; and,
- The *Related Generic Item* and *Unique Item* columns have been replaced by a *Discussion* column.

The *Item Number* column provides a means to cross-reference to Table 1 from the Table 2s.

Further information is provided in the *Discussion* column. 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; and,
- A discussion of how the line item is different than the corresponding line item in NUREG-1801, Volume 1, when it may appear to be consistent (e.g., when there is exception taken to an aging management program that is recommended in NUREG-1801).

3.0.1.2 Table 2

Table 2 provides the detailed results of the aging management reviews for those components and commodities 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 Systems group contains a Table 2 specific to each of the three systems in that group—the Containment Depressurization System, Residual Heat Removal System, and Safety Injection System.

Table 2 consists of the following ten columns:

Row Number

Column 1 identifies the row number. Identifying rows by number provides an aid for rapid identification of a specific row/topic.

Component Type

Column 2 identifies the component types from Section 2 that are subject to aging management review. Typically, component types are listed in alphabetical order, or in approximately the order presented in NUREG-1801. Structural component types are listed in alphabetical order by material, starting with metals, followed by concrete, then other materials.

During the screening process, some structures and components were incorporated into commodity groups based on similarity of their design or materials of construction. Use of commodity groups made it possible to address an entire group of structures and components with a single evaluation. In the aging management reviews described in the following Sections, further definition of commodity groups was performed based on design, material, environmental, and functional characteristics to disposition an entire group with a single aging management review. Commonly used mechanical component types include the following:

- Bolting (includes bolts, studs, nuts and any other fastener components);
- Duct (includes ducts, flanges, and other integral flowpath components);
- Fan housing (includes inlet plenum, diffuser and any other integral pressure retaining subcomponents);

- Filter housing (includes housings, covers, and any other integral subcomponents, but does not include internal filter elements);
- Flexible hose (includes only the flexible bellows - end pieces are evaluated as "tubing");
- Heat exchanger (includes shell, tubes, end bells, covers, and any other integral subcomponents);
- Level gage (only for non-glass type gages);
- Orifice (includes both flow restrictors and flow elements);
- Piping (includes pipes, welds, fittings, elbows, tees, thermowells, flanges, and any other similar pressure-retaining appliance);
- Pump casing (includes pump bowl, cover, volute, and any other integral pressure retaining subcomponents);
- Sight glass (includes any type of level or flow gage made of glass, but not the metallic fittings, which are evaluated as "piping");
- Strainer body (includes housings, covers, and any other integral subcomponents, but does not include internal strainer elements);
- Tank (includes shells, heads, tank nozzles, welds, thermowells, and any other integral subcomponents);
- Tubing (includes fittings, elbows, welds, tees, flanges and any other similar appliances); and,
- Valve body (includes body, cover, and any other integral pressure-retaining subcomponents).

Where possible, plant components/commodities were assigned to groups that coincided with NUREG-1801 component groups to facilitate alignment of components with NUREG-1801.

Intended Function

Column 3 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 4 lists the particular materials of construction for the component type being evaluated.

Environment

Column 5 lists the service 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, electrical, and structural components, respectively. The service environments in these three tables were compared to the environments listed in the NUREG-1801 tables and the NUREG-1801, Volume 2, Chapter 9.D environments, and the corresponding NUREG-1801 environment was included in the tables.

Aging Effect Requiring Management

Column 6 lists the aging effects requiring management for material and environment combinations for each component type.

The BVPS aging management review methods are based on generic industry guidance for determining aging effects for mechanical, structural, and electrical components based on the materials of construction and applicable environmental conditions. The material and environment-based rules in the industry guidance documents are derived from known age-related degradation mechanisms and industry operating experience.

Aging Management Programs

Column 7 lists the programs used to manage the aging effects requiring management. Aging management programs are described in Appendix B.

NUREG-1801 Vol. 2 Item

Column 8 documents identified consistencies with NUREG-1801 by noting the appropriate NUREG-1801, Volume 2, item number.

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

When consistencies between Table 2 results and NUREG-1801 are identified, they are documented by noting the appropriate NUREG-1801, Volume 2, item number in Column 7. If there is no corresponding item number in NUREG-1801, Volume 2, then this row in Column 7 contains "N/A." Thus, a reviewer can readily identify where there is consistency between the BVPS tables and the NUREG-1801, Volume 2, tables.

Table 1 Item

Column 9 lists the corresponding line item from Table 1 to allow correlating the two tables. Column 9 contains "N/A" if there is no corresponding item in NUREG-1801, Volume 1.

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 10 contains notes that are used to describe the degree of consistency or alignment with the line items in NUREG-1801, Volume 2. Notes that use letter designations are standard notes based on Table 4.2-2 of NEI 95-10 [Reference 1.3-7].

Any additional, BVPS-specific notes are identified by a number. Plant-specific notes provide information or clarification regarding the aging management review of the Table 2 line item. Section 3.1 uses plant specific notes numbered in the 100-series (e.g., 101, 102, etc.). Section 3.2 uses plant-specific notes numbered in the 200-series; Section 3.3, in the 300-series; Section 3.4, in the 400-series; Section 3.5, in the 500-series; and Section 3.6, in the 600-series.

Generic notes A through E indicate that a useful comparison may be made between the Table 2 line item and NUREG-1801. Therefore, items associated with notes A through E will also contain a NUREG-1801 Vol. 2 item and a reference to a Table 1 item.

When no matching NUREG-1801 row was found within the NUREG-1801 section being used for comparison, rows from other sections were searched for potential comparison, and such rows were cited if they could result in a note A through E match. However, rows from other NUREG-1801 sections were not used for comparison if "Further Evaluation Required" was indicated for the rows. Thus, when "N/A" is listed for the NUREG-1801 Vol. 2 item and Table 1 item, the generic notes F through J were cited, with a clarification that no match was found within the primary NUREG-1801 section being used for comparison.

The generic and plant-specific notes are listed at the end of the Table 2s in Sections 3.1 through 3.6. These generic and plant specific notes were used when developing the Discussion column content of Tables 3.1.1 through 3.6.1, and the referenced Further Evaluation subsection content preceding each table.

3.0.2 TABLE USE

3.0.2.1 Table 1

Information in the following columns is taken directly from NUREG-1801, Volume 1:

- Component;
- Aging Effect/Mechanism;
- Aging Management Programs; and,
- Further Evaluation Recommended.

The Discussion column explains, in summary, how the BVPS evaluations and programs align with NUREG-1801, Volume 1.

3.0.2.2 Table 2

Table 2 contains the aging management review results and indicates whether or not the results correspond to line items in NUREG-1801, Volume 2. The first column is the row number, to facilitate review and commentary. The next six columns of Table 2 provide the following information:

- Component type;
- Component intended function;
- Material;
- Environment;
- Aging effect requiring management; and,
- Aging management program credited.

If there was a correlation between the combination in Table 2 and a combination for a line item in NUREG-1801, Volume 2, the corresponding NUREG-1801, Volume 2, item number was listed in column 8. If the column contains "N/A," no appropriately corresponding combination in NUREG-1801, Volume 2, was identified.

If a NUREG-1801, Volume 2, line item was identified in column 7, a Table 1 row number was referenced in column 9. This reference corresponds to the NUREG-1801, Volume 2, "roll-up" to the NUREG-1801, Volume 1, tables.

Many of the NUREG-1801 evaluations refer to plant-specific programs. In these cases, Note E was used for correlations between the combination in Table 2 and a combination for a line item in NUREG-1801, Volume 2.

3.0.3 CHAPTER 3 REFERENCES

3.0-1 Regulatory Guide 1.43, *Control of Stainless Steel Weld Cladding of Low-Alloy Steel Components,* May 1973.

3.0-2 Information Notice 94-63, *Boric Acid Corrosion of Changing Pump Casing Caused by Cladding Cracks*, U.S. Nuclear Regulatory Commission, August 30, 1994.

3.0-3 NUREG-1785, *Safety Evaluation Report Related to the License Renewal of H. B. Robinson Steam Electric Plant, Unit 2 (RNP),* March 2004.

3.0-4 NRC Memorandum for The Commissioners, from James M. Taylor, Executive Director for Operations, NRC, *Resolution of Spent Fuel Storage Pool Action Plan Issues* (ML003706364), July 26, 1996.

3.0-5 NUREG-1787, *Safety Evaluation Report Related to the License Renewal of the Virgil C. Summer Nuclear Station*, March 2004.

3.0-6 ACI 318, *Building Code Requirements for Reinforced Concrete*, 1963, 1971.

3.0-7 ACI 301, *Specification for Structural Concrete for Buildings*, 1969.

3.0-8 ASTM C227, *Potential Alkali Reactivity of Cement - Aggregate Combinations,* 1971.

3.0-9 ASTM C289, *Potential Reactivity of Aggregate,* 1971.

Table 3.0-1
Service Environments for Mechanical Aging Management Reviews

BVPS Environment	Description	NUREG-1801 Environment
Air - indoor uncontrolled	Indoor air with temperatures higher than the dew point. Condensation can occur, but only rarely; equipment surfaces are normally dry.	Air - indoor uncontrolled
Air - outdoor	The outdoor environment consists of moist, ambient temperatures and humidity, and exposure to weather, including precipitation and wind. The atmosphere near BVPS does not contain salt, as coastal areas may. The component is exposed to air and local weather conditions. Outdoor air may include the potential to pool water.	Air - outdoor
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.	Air with borated water leakage
Air with reactor coolant leakage	Air and reactor coolant leakage on high temperature systems.	Air with reactor coolant leakage
Closed cycle cooling water	Treated water subject to the closed cycle cooling water chemistry program.	Closed cycle cooling water
Closed cycle cooling water >60°C (>140°F)	Treated water subject to the closed cycle cooling water chemistry program. Closed cycle cooling water above 60°C (140°F) allows the possibility of stainless steel stress corrosion cracking.	Closed cycle cooling water >60°C (>140°F)
Concrete	The external environment of components embedded in concrete.	Concrete
Condensation	Condensation on the surfaces of systems with temperatures below the dew point, or in the associated drains. Condensation may be internal or external, and is also used to describe the internal vapor space of tanks that are vented to atmosphere. Condensation includes the potential for concentration of contaminants.	Condensation (internal/external)

Table 3.0-1
Service Environments for Mechanical Aging Management Reviews (continued)

BVPS Environment	Description	NUREG-1801 Environment
Diesel exhaust	Gases, fluids, and particulates present in diesel engine exhaust.	Diesel exhaust
Dried air	Air that has been treated to reduce the dew point to well below the system operating temperature.	Air, dry; Dried air
Fuel oil	Diesel oil, No. 2 oil, or other liquid hydrocarbons used to fuel diesel engines. Fuel oil is used for combustion engines with possible water contamination.	Fuel oil
Gas	Internal gas environments from dry air, inert or non-reactive gases. Oxygen is not considered to be present in this environment. Gas is used to describe carbon dioxide and Halon environments, but replacement gases for Halon are not used at BVPS.	Gas
Lubricating oil	Lubricating oils are low-to-medium viscosity hydrocarbons, with the possibility of containing contaminants and/or moisture, used for bearing, gear, and engine lubrication. This environment name is also used for the hydraulic fluid associated with the personnel airlock operating mechanism.	Lubricating oil
Raw water	Raw, untreated, river, or ground water. Floor drains and building sumps may be exposed to a variety of untreated water that is thus classified as raw water, for the determination of aging effects.	Raw water
Reactor coolant	Treated water in the Reactor Coolant System and connected systems at or near full operating temperature.	Reactor coolant
Reactor coolant >250°C (>482°F)	Treated water above thermal embrittlement threshold for cast austenitic stainless steel.	Reactor coolant >250°C (>482°F)
Reactor coolant >250°C (>482°F) and neutron flux	Water in the Reactor Coolant System and connected systems above thermal embrittlement threshold for cast austenitic stainless steel, and above the fluence threshold for neutron embrittlement.	Reactor coolant >250°C (>482°F) and neutron flux

Table 3.0-1
Service Environments for Mechanical Aging Management Reviews (continued)

BVPS Environment	Description	NUREG-1801 Environment
Reactor coolant and neutron flux	Reactor core environment that will result in a neutron fluence exceeding the threshold for management at the end of the license renewal term.	Reactor coolant and neutron flux
Secondary feedwater/steam	Feedwater or steam at or near full operating temperature, subject to the secondary water chemistry program.	Secondary feedwater/steam
Soil	External environment for components exposed to soil (including the air/soil interface) or buried in the soil, including groundwater in the soil. This name is also used to describe the environment for exterior surface of outdoor tank bottoms that are mounted on a concrete pad.	Soil
Treated borated water	Treated water that contains soluble boric acid.	Treated borated water
Treated borated water >250°C (>482°F)	Treated water with boric acid above thermal embrittlement threshold for cast austenitic stainless steel of 250°C (482°F).	Treated borated water >250°C (>482°F)
Treated borated water >60°C (>140°F)	Treated water with boric acid above the stress corrosion cracking threshold for stainless steel of 60°C (140°F).	Treated borated water >60°C (>140°F)
Treated water	Treated water is demineralized water. Treated water could be deaerated and include corrosion inhibitors, biocides, or some combination of these treatments. Treated water does not contain significant concentrations of boric acid. Secondary side water is considered to be "treated water," and may contain approximately 5 to 10 ppm boric acid.	Treated water
Treated water >250°C (>482°F)	Treated water above the thermal embrittlement threshold for cast austenitic stainless steel of 250°C (482°F).	Treated water >250°C (>482°F)
Treated water >60°C (>140°F)	Treated water above the 60°C (140°F) stress corrosion cracking threshold for stainless steel.	Treated water >60°C (>140°F)

Table 3.0-2
Service Environments for Electrical Aging Management Reviews

BVPS Environment	Description	NUREG-1801 Environment
Adverse localized environment	The conductor insulation used for electrical cables in instrumentation circuits can be subjected to an adverse localized environment. This environment can be represented within a specific NUREG-1801 AMR line item as being due to any of the following: (1) exposure to moisture and voltage stress; (2) heat, radiation, or moisture, in the presence of oxygen; (3) heat, radiation, or moisture, in the presence of oxygen or >60- year service limiting temperature; or, (4) adverse localized environment caused by heat, radiation, oxygen, moisture, or voltage. The term ">60-year service limiting temperature" refers to that temperature that exceeds the temperature below which the material has a 60-year or greater service lifetime. Exposure to moisture and voltage stress is described as a wetted environment with applied voltage 2kV to 35kV. This environment applies to underground, medium-voltage cables energized at least 25% of the time.	Adverse localized environment
Air - indoor	Normal indoor operating parameters	Air - indoor
Air - outdoor	Ambient outdoor conditions	Air - outdoor
Air with borated water leakage	Containment atmosphere with acceptable RCS (borated water) leakage	Air with borated water leakage

Table 3.0-3
Service Environments for Structural Aging Management Reviews

BVPS Environment	Description	NUREG-1801 Environment
Below grade	Soil, sub-grade or backfill materials. Depending on site groundwater table levels, below grade may also include exposure to the chemicals in the groundwater. The groundwater chemistry, which may be acidic or contain chlorides and sulfates, plays a lead role in the determination of the degradation of below-grade structural components.	[Structural components below grade were not aligned to any NUREG-1801 rows]
Exposed to raw water	Water from the nearby river or a groundwater source. Raw water is naturally oxygenated and contains varying amounts of impurities (e.g., chlorides or sulfates). Raw water is also used to describe the environment in manholes that may accumulate water.	Air - outdoor; Raw water; Water - flowing
Exposed to treated water	Filtered and chemically treated demineralized water that may be deaerated, deionized, include corrosion inhibitors, biocides and boric acid, or a combination of these treatments. Treated (non-borated) water may be used in Auxiliary Systems, such as Primary Component Cooling and Fire Protection. However, since the treated water is contained within the system, it does not involve structural components, whereas, structural components may be submerged in borated water (e.g., within the fuel transfer canal and spent fuel pool).	Treated borated water; Treated water <60C (<140F)
Exposed to weather	Structural components and commodities not located in buildings and exposed to atmospheric conditions and weather are subjected to temperatures ranging from -15°F to 115°F, relative humidity of 100 percent, and negligible radiation levels. This environment may contain corrosive chemicals including halides, sulfates, ozone and other aggressive substances that can influence the nature, rate, and severity of aging. There is no exposure to salt water/spray at BVPS.	Air - outdoor
Protected from weather	Structural components and commodities protected from weather may be exposed to ambient temperatures up to 150°F, relative humidity up to 100 percent, and neutron and gamma radiation.	Air with borated water leakage; Air - indoor uncontrolled

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3.1 AGING MANAGEMENT OF REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEM

3.1.1 INTRODUCTION

This chapter 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 listed systems are addressed in this chapter. A link to the associated system description section in Chapter 2 is also provided.

- Reactor Vessel (Section 3.1.2.1.1) / (Section 2.3.1.1)
- Reactor Vessel Internals (Section 3.1.2.1.2) / (Section 2.3.1.2)
- Reactor Coolant System (Section 3.1.2.1.3) / (Section 2.3.1.3)

Table 3.1.1, *Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for the Reactor Vessel, Vessel Internals, and Reactor Coolant System*, provides the summary of the programs evaluated in NUREG-1801 [Reference 1.3-5] for the Reactor Coolant System component groups. This table uses the format described in Section 3.0.1. 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 Reactor Vessel – Summary of Aging Management Evaluation
- Table 3.1.2-2 Reactor Vessel Internals – Summary of Aging Management Evaluation
- Table 3.1.2-3 Reactor Coolant System – Summary of Aging Management Evaluation

3.1.2.1 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 Reactor Coolant System components. Programs are described in Appendix B. Further details are provided in Tables 3.1.2-1 through 3.1.2-3.

3.1.2.1.1 Reactor Vessel

Materials

Reactor Vessel components are constructed of the following materials.

- Cast austenitic stainless steel
- High strength low alloy steel
- Nickel alloy
- SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process
- Stainless steel
- Steel
- Steel with stainless steel cladding

Environment

Reactor Vessel components are exposed to the following environments.

- Air with borated water leakage
- Air with reactor coolant leakage
- Reactor coolant
- Reactor coolant >250°C (>482°F)
- Reactor coolant and neutron flux

Aging Effects Requiring Management

The following aging effects associated with the Reactor Vessel components require management.

- Cracking
- Cumulative fatigue damage
- Loss of fracture toughness

- Loss of material

Aging Management Programs

The following aging management programs manage the effects of aging on Reactor Vessel components.

- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (Section B.2.2)
- Boric Acid Corrosion (Section B.2.7)
- Flux Thimble Tube Inspection (Section B.2.19)
- Nickel-Alloy Nozzles and Penetrations (Section B.2.28)
- Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Head (Section B.2.29)
- One-Time Inspection (Section B.2.30)
- Reactor Head Closure Studs (Section B.2.34)
- Reactor Vessel Integrity (Section B.2.35)
- Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) (Section B.2.41)
- Water Chemistry (Section B.2.42)

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.

- Reactor coolant
- Reactor coolant >250°C (>482°F) and neutron flux
- Reactor coolant and neutron flux

Aging Effects Requiring Management

The following aging effects associated with the Reactor Vessel Internals components require management.

- Change in dimensions
- Cracking
- Cumulative fatigue damage
- Loss of fracture toughness
- Loss of material
- Loss of preload

Aging Management Programs

The following aging management programs manage the effects of aging on Reactor Vessel Internals components.

- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (Section B.2.2)
- PWR Vessel Internals (Section B.2.33)
- Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) (Section B.2.40)
- Water Chemistry (Section B.2.42)

3.1.2.1.3 Reactor Coolant System

Materials

Reactor Coolant System components are constructed of the following materials.

- Cast austenitic stainless steel
- Nickel alloy
- Stainless steel
- Steel
- Steel with nickel alloy cladding
- Steel with stainless steel cladding

Environment

Reactor Coolant System components are exposed to the following environments.

- Air - indoor uncontrolled
- Air with borated water leakage
- Closed cycle cooling water
- Gas
- Reactor coolant
- Reactor coolant >250°C (>482°F)
- Secondary feedwater/steam
- Treated borated water
- Treated water

Aging Effects Requiring Management

The following aging effects associated with the Reactor Coolant System components require management.

- Cracking
- Cumulative fatigue damage
- Denting
- Loss of fracture toughness
- Loss of material
- Reduction of heat transfer

Aging Management Programs

The following aging management programs manage the effects of aging on Reactor Coolant System components.

- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (Section B.2.2)
- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Nickel-Alloy Nozzles and Penetrations (Section B.2.28)
- One-Time Inspection (Section B.2.30)

- One-Time Inspection of ASME Code Class 1 Small Bore Piping (Section B.2.31)
- Steam Generator Tube Integrity (Section B.2.38)
- Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) (Section B.2.41)
- Water Chemistry (Section B.2.42)

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 [Reference 1.3-4]. The following sections are numbered in accordance with the discussions in NUREG-1800 and explain the BVPS approach to those areas requiring further evaluation. Programs are described in Appendix B.

3.1.2.2.1 Cumulative Fatigue Damage

Fatigue is a time-limited aging analysis (TLAA) as defined in 10 CFR 54.3 [Reference 1.3-3]. TLAAs are required to be evaluated for the period of extended operation in accordance with 10 CFR 54.21(c)(1). BVPS license renewal TLAA evaluations are addressed in Chapter 4 of the LRA; the evaluation of TLAAs associated with cumulative fatigue damage is addressed in Section 4.3.

All RCS components, with the exception of the pressurizer relief tank, the rupture disks, and the associated carbon and low alloy steel (Steel) piping and valve bodies, are exposed to temperatures above the threshold for cumulative fatigue damage. The external environments may be air with borated water leakage, air with reactor coolant leakage or air-indoor uncontrolled. Reactor coolant pump thermal barriers and additional steam generator components (including the divider plate and tubesheet) are additions to the listed NUREG-1801 components based on matching the NUREG-1801 material, environment, aging effect, and aging management program. Table 3.1.1, Items 3.1.1-05, 3.1.1-06, 3.1.1-07, 3.1.1-08, 3.1.1-09, and 3.1.1-10, identify cumulative fatigue damage as an aging effect for the subject components and list "TLAA" in the program column.

3.1.2.2.2 Loss of Material Due to General, Crevice, and Pitting Corrosion

3.1.2.2.2.1 PWR Steam Generator Shell and BWR Reactor Vessel Components Exposed to Treated Water and Steam

Loss of material for BWR reactor vessel components is applicable to BWR plants only.

Loss of material of once-through type steam generators, as found in Babcock & Wilcox pressurized water reactors, is not applicable; since the BVPS steam generators are of a recirculating design supplied by Westinghouse as described in Unit 1 UFSAR, Section 4.2.2.4, and Unit 2 UFSAR, Section 5.4.2.4.

3.1.2.2.2.2 BWR Isolation Condenser Components Exposed to Reactor Coolant

Loss of material of BWR isolation condenser components is applicable to BWR plants only.

3.1.2.2.2.3 Reactor Vessel Shells, Heads, and Welds; Flanges; Nozzles; Penetrations; Pressure Housings; and Safe Ends

Loss of material of BWR reactor vessel and reactor coolant pressure boundary components is applicable to BWR plants only.

3.1.2.2.2.4 PWR Steam Generator Shell and Transition Cone

Loss of material due to general, pitting, and crevice corrosion could occur in the steel steam generator upper and lower shell and transition cone exposed to secondary feedwater and steam. NUREG-1801 clarifies that this issue is limited to Westinghouse Model 44 and 51 Steam Generators where a high-stress region exists at the shell-to-transition cone weld.

BVPS manages the steam generator shell and transition cone with a combination of the Water Chemistry Program (Section B.2.42) together with the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program (Section B.2.2) for Class 2 components. The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the prevention or mitigation of the loss of material aging effect. The ASME Section XI Inservice Inspection, Subsections IWB, IWC, or IWD Program has been shown to be effective in managing aging effects in Class 1, 2, or 3 components and their integral attachments in light-water cooled power plants.

The replacement steam generators in use at BVPS for Unit 1 are Model 54F generators; Unit 2 has Model 51 generators. Additional inspection requirements have been incorporated into the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program (Section B.2.2) to detect general and pitting corrosion and the resulting corrosion-fatigue cracking in the Unit 2 Model 51 steam generators.

3.1.2.2.3 Loss of Fracture Toughness Due to Neutron Irradiation Embrittlement

3.1.2.2.3.1 Neutron Irradiation Embrittlement TLAA

Certain aspects of the loss of fracture toughness due to neutron irradiation embrittlement are TLAAs as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). The evaluation of this TLAA is addressed separately in Section 4.2.

3.1.2.2.3.2 Reactor Vessel Embrittlement

Loss of fracture toughness due to neutron irradiation embrittlement could occur in the Reactor Vessel beltline, shell, nozzle, and welds.

A materials surveillance program monitors neutron irradiation embrittlement of the Reactor Vessel. The BVPS safety injection lines connect to the loops, are not exposed to neutron flux, and the safety injection nozzles are not managed by the Reactor Vessel Integrity Program. The BVPS Reactor Vessel Integrity Program, and the results of its evaluation for license renewal, are presented in Appendix B, Section B.2.35.

3.1.2.2.4 Cracking Due to Stress Corrosion Cracking (SCC) and Intergranular Stress Corrosion Cracking (IGSCC)

3.1.2.2.4.1 BWR Vessel Leak Detection Lines

Cracking of BWR vessel leak detection lines is applicable to BWR plants only.

3.1.2.2.4.2 BWR Isolation Condenser Components

Cracking of isolation condenser components is applicable to BWR plants only.

3.1.2.2.5 Crack Growth Due to Cyclic Loading

The controls imposed during weld cladding of ferritic steel components for the Unit 2 Reactor Vessel are in conformance with RG 1.43, *Control of Stainless Steel Weld Cladding of Low-Alloy Steel Components* [Reference 3.0-1]. Therefore, crack growth due to cyclic loading associated with underclad cracking is not applicable to the BVPS Unit 2 Reactor Vessel. Analysis of underclad cracking for the BVPS Unit 1 Reactor Vessel is a TLAA. The evaluation of this TLAA is addressed separately in Section 4.7.2.

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

Loss of fracture toughness due to neutron irradiation embrittlement and void swelling could occur in stainless steel and nickel alloy Reactor Vessel Internals exposed to reactor coolant and neutron flux.

BVPS provides in the UFSAR Supplement (Section A.1.33) a commitment 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.

This commitment is identified in the PWR Vessel Internals Program description (Section B.2.33).

3.1.2.2.7 Cracking Due to Stress Corrosion Cracking (SCC)

3.1.2.2.7.1 PWR Vessel Bottom-Mounted Instrument Guide Tubes

Cracking due to SCC could occur in stainless steel PWR Reactor Vessel bottom-mounted guide tubes.

BVPS manages cracking from SCC of these lines by a combination of the Water Chemistry Program and the One-Time Inspection Program.

The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the prevention or mitigation of the cracking aging effect. The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation.

The Reactor Vessel leak detection piping is aligned to item 3.1.1-31 (IV.A2-19) for cracking due to SCC. See further evaluation for Section 3.1.2.2.13.

3.1.2.2.7.2 Cast Austenitic Stainless Steel (CASS) Reactor Coolant System Components

Cracking due to SCC could occur in Class 1 PWR CASS piping exposed to reactor coolant. Cracking due to SCC of the CASS Reactor Coolant System components is managed by a combination of the Water Chemistry Program (Section B.2.42) together with the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program (Section B.2.2). The Water Chemistry Program provides for monitoring and controlling of water chemistry using procedures and processes for the prevention or mitigation of the cracking aging effect. The ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program has been shown to be effective in managing aging effects in Class 1, 2, or 3 components and their integral attachments in light-water cooled power plants.

3.1.2.2.8 Cracking Due to Cyclic Loading

3.1.2.2.8.1 BWR Jet Pump Sensing Lines

Cracking of BWR jet pump sensing line is applicable to BWR plants only.

3.1.2.2.8.2 BWR Isolation Condenser Components

Cracking of isolation condenser components is applicable to BWR plants only.

3.1.2.2.9 Loss of Preload Due to Stress Relaxation

Loss of preload due to stress relaxation could occur in stainless steel and nickel alloy PWR Reactor Vessel Internal components exposed to reactor coolant. BVPS includes the upper internals hold-down springs, as well as bolting associated with the core baffle/former, RCCA guide tube, lower internals, and core barrel assembly in this item. BVPS provides in the UFSAR Supplement (Section A.1.33) a commitment 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.

This commitment is identified in the PWR Vessel Internals Program description (Section B.2.33).

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. BVPS does not have impingement plates. Other steam generator support components that are susceptible to erosion are aligned to NUREG-1801 row IV.D1-9, item 3.1.1-76, and are managed by the Water Chemistry (Section B.2.42) and Steam Generator Tubing Integrity (Section B.2.38) programs.

3.1.2.2.11 Cracking Due to Flow-Induced Vibration of BWR Steam Dryers

Cracking of BWR steam dryer components is applicable to BWR plants 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.

BVPS manages the Reactor Vessel Internals components exposed to reactor coolant with the Water Chemistry Program (Section B.2.42) and a PWR Vessel Internals Program (Section B.2.33) commitment.

The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the prevention or mitigation of the cracking aging effect. In addition, BVPS provides in the UFSAR Supplement (Section A.1.33) a commitment 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 in a PWR Vessel Internals Program 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.

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

Cracking due to PWSCC could occur in PWR components made with nickel alloy and steel with nickel alloy cladding exposed to reactor coolant, including reactor coolant pressure boundary components and penetrations inside the RCS such as pressurizer heater sheathes and sleeves, nozzles, and other internal components.

BVPS manages cracking due to SCC (including PWSCC) of nickel alloy and low alloy steel with nickel alloy cladding, including reactor coolant pressure boundary components and penetrations inside the RCS such as pressurizer safe end welds, bottom instrument tubes, steam generator drain tubes, tube sheets and primary safe end welds, and other internal components by a combination of the Water Chemistry Program (Section B.2.42) and the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program (Section B.2.2).

The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the prevention or mitigation of the cracking aging effect. The ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program has been shown to be effective in managing aging effects in Class 1, 2, or 3 components and their integral attachments in light-water cooled power plants.

In addition, for nickel alloy, within the Nickel-Alloy Nozzles and Penetrations Program (Section B.2.28) description in the UFSAR Supplement (Section A.1.28), BVPS provided a commitment to develop a plant-specific aging management program that will implement applicable (1) NRC Orders, Bulletins and Generic Letters, and (2) staff-accepted industry guidelines.

3.1.2.2.14 Wall Thinning Due to Flow-Accelerated Corrosion

Wall thinning due to flow-accelerated corrosion could occur in steam generator feedwater inlet rings and supports.

BVPS uses the One-Time Inspection Program (Section B.2.30) to manage loss of material due to flow-accelerated corrosion of the steam generator feedwater rings.

The One-Time Inspection Program is consistent with the recommendations of NUREG-1801 and will provide the plant-specific aging management for these components.

3.1.2.2.15 Changes in Dimensions Due to Void Swelling

Changes in dimensions due to void swelling could occur in stainless steel, cast austenitic stainless steel, and nickel alloy PWR Reactor Vessel Internals components exposed to reactor coolant.

BVPS provides in the UFSAR Supplement (Section A.1.33) a commitment 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.

This commitment is contained within the description of the PWR Vessel Internals Program (Section B.2.33).

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

3.1.2.2.16.1 Control Rod Drive Head Penetration Pressure Housings and Primary Side Steam Generator Heads, Tubesheets, and Welds

Note that BVPS has edited the text of the Section 3.1.2.2.16.1 title to include the components listed in NUREG 1801 Volume 2, IV.A2-11, which rolls up to Table 1 item 3.1.1-34 and points to this further evaluation item.

Cracking due to SCC could occur on the primary coolant side of PWR steel steam generator upper and lower heads, tubesheets, and tube-to-tube sheet welds made or clad with stainless steel. Cracking due to PWSCC could occur on the primary coolant side of PWR steel steam generator upper and lower heads, tubesheets, and tube-to-tubesheet welds made or clad with nickel alloy.

BVPS manages cracking due to SCC by the Water Chemistry Program (Section B.2.42) in combination with the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program (Section B.2.2). The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the prevention or mitigation of the cracking aging effect. The ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program has been shown to be effective in managing aging effects in Class 1, 2, or 3 components and their integral attachments in light-water cooled power plants.

BVPS does not have nickel alloy pressure housings for which this item is applicable. Cracking of the nickel alloy nozzles and welds is addressed in Table 1 items 3.1.1-31 (See further evaluation for Section 3.1.2.2.13), 3.1.1-65 and 3.1.1-69.

3.1.2.2.16.2 Cracking Due To SCC and PWSCC of Pressurizer Spray Heads

Cracking due to SCC could occur on stainless steel pressurizer spray heads; cracking due to PWSCC could affect nickel alloy pressurizer spray heads. The Pressurizer Spray Heads at BVPS are fabricated from cast austenitic stainless steel with stainless steel coupling and locking bar.

BVPS manages cracking due to SCC of the Pressurizer Spray Head with a combination of the Water Chemistry Program (Section B.2.42) and the One-Time Inspection Program (Section B.2.30). The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the prevention or mitigation of the cracking aging effect. The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation. The added stainless steel components are heat exchangers, hydraulic isolators, piping, and tubing.

No licensee commitment regarding nickel alloy spray head inspection is required since the pressurizer spray heads at BVPS are fabricated from cast austenitic stainless steel.

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 SCC, PWSCC, or IASCC could occur in stainless steel and nickel alloy PWR Reactor Vessel Internals components.

BVPS manages cracking due to SCC of the PWR stainless steel and nickel alloy Reactor Vessel Internals components with the Water Chemistry Program (Section B.2.42) and a PWR Vessel Internals Program (Section B.2.33) commitment. The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the prevention or mitigation of the cracking aging effect. The Unit 1 lower internal assembly diffuser plate is included here.

In addition, BVPS provides in the UFSAR Supplement (Section A.1.33) a commitment to implement a PWR Vessel Internals Program, and 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 Vessel Internals to the NRC for review and approval.

This commitment is identified in the PWR Vessel Internals Program description (Section B.2.33).

3.1.2.2.18 Quality Assurance for Aging Management of Nonsafety-related Components

See Appendix B, Section B.1.3, for discussion of BVPS quality assurance procedures and administrative controls for aging management programs.

3.1.2.3 Time-Limited Aging Analyses

The following Time-Limited Aging Analyses (TLAAs) are associated with Reactor Vessel, Internals, and Reactor Coolant System components. The section of the application that contains the TLAA review results is indicated in parentheses.

1. Neutron Irradiation Embrittlement (Section 4.2, Reactor Vessel Neutron Embrittlement)
2. Cumulative Fatigue Damage (Section 4.3, Metal Fatigue)

3.1.3 CONCLUSION

The Reactor Vessel, Internals, and Reactor Coolant System components and commodities having aging effects requiring management have been evaluated, and aging management programs have been selected to manage the aging effects. A description of the aging management programs is provided in Appendix B, along with a demonstration that the identified aging effects will be managed for the period of extended operation.

Therefore, based on the demonstration provided in Appendix B, the effects of aging will be adequately managed so that there is reasonable assurance that the intended functions of Reactor Vessel, Internals, and Reactor Coolant System components and commodities will be maintained consistent with the current licensing basis during the period of extended operation.

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

Table 3.1.1 : Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-01	Steel pressure vessel support skirt and attachment welds	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Not applicable. BVPS employs a Westinghouse vessel with no support skirt, so the applicable NUREG-1801 line was not used.
3.1.1-02	BWR only—not used				
3.1.1-03	BWR only—not used				
3.1.1-04	BWR only—not used				
3.1.1-05	Stainless steel and nickel alloy reactor vessel internals components	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Consistent with NUREG-1801. Fatigue of metal components is addressed as a TLAA in Section 4.3. Further evaluation is documented in Section 3.1.2.2.1.
3.1.1-06	Nickel Alloy tubes and sleeves in a reactor coolant and secondary feedwater/steam environment	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Consistent with NUREG-1801, with additional steam generator components. Fatigue of metal components is addressed as a TLAA in Section 4.3. Further evaluation is documented in Section 3.1.2.2.1.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-07	Steel and stainless steel reactor coolant pressure boundary closure bolting, head closure studs, support skirts and attachment welds, pressurizer relief tank components, steam generator components, piping and components external surfaces and bolting	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Consistent with NUREG-1801, with additional components. For the purpose of NUREG-1801 comparison, the BVPS external environments considered are equivalent to the cited NUREG-1801 external environment. Fatigue of metal components is addressed as a TLAA in Section 4.3. Further evaluation is documented in Section 3.1.2.2.1.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-08	Steel; stainless steel; and nickel-alloy reactor coolant pressure boundary piping, piping components, piping elements; flanges; nozzles and safe ends; pressurizer vessel shell heads and welds; heater sheaths and sleeves; penetrations; and thermal sleeves	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c) and environmental effects are to be addressed for Class 1 components	Yes, TLAA.	Consistent with NUREG-1801, with the addition of the reactor coolant pump thermal barrier heat exchangers. Fatigue of metal components is addressed as a TLAA in Section 4.3. Further evaluation is documented in Section 3.1.2.2.1.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-09	Steel; stainless steel; steel with nickel-alloy or stainless steel cladding; nickel-alloy reactor vessel components: flanges; nozzles; penetrations; pressure housings; safe ends; thermal sleeves; vessel shells, heads and welds	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c) and environmental effects are to be addressed for Class 1 components	Yes, TLAA	Consistent with NUREG-1801. Fatigue of metal components is addressed as a TLAA in Section 4.3. Further evaluation is documented in 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	Consistent with NUREG-1801, with additional steam generator components. Fatigue of metal components is addressed as a TLAA in Section 4.3. Further evaluation is documented in Section 3.1.2.2.1.
3.1.1-11	BWR only—not used				

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

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	Not applicable. This item is applicable only to once-through steam generators. The BVPS steam generators are recirculating, as described in UFSAR Sections 4.2.2.4 for Unit 1 and 5.4.2.4 for Unit 2, and not once-through. Further evaluation is documented in Section 3.1.2.2.2.1.
3.1.1-13	BWR only—not used				
3.1.1-14	BWR only—not used				
3.1.1-15	BWR only—not used				

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-16	Steel steam generator upper and lower shell and transition cone exposed to secondary feedwater and steam	Loss of material due to general, pitting and crevice corrosion	Inservice Inspection (IWB, IWC, and IWD), 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	Consistent with NUREG-1801, with additional components and an AMP exception. BVPS manages loss of material of steam generator components with a combination of the Water Chemistry (B.2.42) and the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2) Programs. BVPS Unit 1 replacement steam generators are Model 54F; Unit 2 has Model 51. Additional inspection requirements have been incorporated into AMP ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2) to detect general and pitting corrosion and the resulting corrosion-fatigue cracking in the Unit 2 Model 51 steam generators. Further evaluation is documented in Section 3.1.2.2.2.4.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 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 Part 50 and RG 1.99. The applicant may choose to demonstrate that the materials of the nozzles are not controlling for the TLAA evaluations.	Yes, TLAA	Consistent with NUREG-1801. Loss of fracture toughness due to neutron irradiation embrittlement is evaluated as a TLAA in Section 4.2. Further evaluation is documented in Section 3.1.2.2.3.1.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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, with a plant-specific program assignment, and with the exception of the safety injection nozzles. The BVPS safety injection lines connect to the reactor coolant loops, so the safety injection nozzles are not exposed to neutron flux greater than 1.0E+17 n/cm^2 at the end of the license renewal term, and are not managed by the Reactor Vessel Integrity (B.2.35) Program, which is used to manage the aging effect for the components that roll-up to this item. The safety injection nozzles are evaluated and managed by a combination of the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2) and Water Chemistry (B.2.42) Programs. (See Item 3.1.1-68 and Item 3.1.1-83.) Further evaluation is documented in Section 3.1.2.2.3.2.
3.1.1-19	BWR only—not used				

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-20	BWR only—not used				
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	Consistent with NUREG-1801, with additional components. Crack growth due to cyclic loading is evaluated as a TLAA in Section 4.7.2 Further evaluation is documented in Section 3.1.2.2.5.
3.1.1-22	Stainless steel and nickel alloy reactor vessel internals components exposed to reactor coolant and neutron flux	Loss of fracture toughness due to neutron irradiation embrittlement, void swelling	FSAR supplement commitment to (1) participate in industry RVI aging programs, (2) implement applicable results, and (3) submit for NRC approval > 24 months before the period of extended operation an RVI inspection plan based on industry recommendation.	No, but licensee commitment to be confirmed	Consistent with NUREG-1801. The BVPS commitment is described in Appendix A within the PWR Vessel Internals Program (A.1.33) description. Further evaluation is documented in Section 3.1.2.2.6.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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	Consistent with NUREG-1801 for the stainless steel bottom-mounted guide tubes. BVPS manages the stainless steel bottom-mounted guide tubes with the Water Chemistry (B.2.42) and One-Time Inspection (B.2.30) Programs. Further evaluation is documented in Section 3.1.2.2.7.1. The reactor vessel closure head flange leak detection lines are aligned to Item 3.1.1-31 (NUREG-1801, row IV.A2-19) for cracking due to SCC. See further evaluation discussion in Section 3.1.2.2.13.
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	Consistent with NUREG-1801, with an AMP exception. BVPS manages the aging effect with the Water Chemistry (B.2.42) and ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2) Programs. Further evaluation is documented in Section 3.1.2.2.7.2.
3.1.1-25	BWR only—not used				

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-26	BWR only—not used				
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, and (3) submit for NRC approval > 24 months before the period of extended operation an RVI inspection plan based on industry recommendation.	No, but licensee commitment to be confirmed	Consistent with NUREG-1801, with additional components. The BVPS commitment is described in Appendix A within the PWR Vessel Internals Program (A.1.33) description. Further evaluation is documented in 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. BVPS does not have impingement plates. Steam generator components susceptible to erosion roll up to Item 3.1.1-76. See discussion in further evaluation Section 3.1.2.2.10.
3.1.1-29	BWR only—not used				

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

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, and (3) submit for NRC approval > 24 months before the period of extended operation an RVI inspection plan based on industry recommendation.	No, but licensee commitment needs to be confirmed	Consistent with NUREG-1801, with additional components. BVPS manages the aging effect with the Water Chemistry (B.2.42) Program. The BVPS commitment is described in Appendix A within the PWR Vessel Internals Program (A.1.33) description. Further evaluation is documented in Section 3.1.2.2.12.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 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	Consistent with NUREG-1801, with additional components and an AMP exception. BVPS manages the aging effect with a combination of the Water Chemistry (B.2.42), and ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2) Programs. The BVPS commitment is described in Appendix A within the Nickel-Alloy Nozzles and Penetrations Program (A.1.28) description. Further evaluation is documented in 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	Consistent with NUREG-1801. BVPS manages the aging effect with the One-Time Inspection (B.2.30) Program. Further evaluation is documented in Section 3.1.2.2.14.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 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, and (3) submit for NRC approval > 24 months before the period of extended operation an RVI inspection plan based on industry recommendation.	No, but licensee commitment to be confirmed	Consistent with NUREG-1801, with additional components. The BVPS commitment is described in Appendix A within the PWR Vessel Internals Program (A.1.33) description. Further evaluation is documented in Section 3.1.2.2.15.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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	Consistent with NUREG-1801, with additional components and an AMP exception. BVPS manages the aging effect with a combination of the Water Chemistry (B.2.42) Program and ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2) Program. The BVPS commitment is described in Appendix A within the Nickel-Alloy Nozzles and Penetrations Program (A.1.28) description. Further evaluation is documented in Section 3.1.2.2.16.1.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 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	Not applicable. This item is applicable only to once-through steam generators. The BVPS steam generators are recirculating, as described in UFSAR Sections 4.2.2.4 for Unit 1 and 5.4.2.4 for Unit 2, and not once-through. No licensee commitment is required.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1					
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	Consistent with NUREG-1801, with additional components. BVPS manages the aging effect with a combination of Water Chemistry (B.2.42) and the One-Time Inspection (B.2.30) Programs. No licensee commitment is required since the pressurizer spray head at BVPS is fabricated from cast austenitic stainless steel. Further evaluation is documented in Section 3.1.2.2.16.2.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1					
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, and (3) submit for NRC approval > 24 months before the period of extended operation an RVI inspection plan based on industry recommendation.	No, but licensee commitment needs to be confirmed	Consistent with NUREG-1801, with an additional component. BVPS manages the aging effect with the Water Chemistry (B.2.42) Program and a commitment for the PWR Vessel Internals (B.2.33) Program. The BVPS commitment is described in Appendix A within the PWR Vessel Internals Program (A.1.33) description. Further evaluation is documented in Section 3.1.2.2.17.
3.1.1-38	BWR only—not used				
3.1.1-39	BWR only—not used				
3.1.1-40	BWR only—not used				
3.1.1-41	BWR only—not used				
3.1.1-42	BWR only—not used				
3.1.1-43	BWR only—not used				

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-44	BWR only—not used				
3.1.1-45	BWR only—not used				
3.1.1-46	BWR only—not used				
3.1.1-47	BWR only—not used				
3.1.1-48	BWR only—not used				
3.1.1-49	BWR only—not used				
3.1.1-50	BWR only—not used				
3.1.1-51	BWR only—not used				

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 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. BVPS has not identified cracking, wear or loss of preload for any bolting configuration. The conditions required to support SCC in bolting are: 1. Surface is subject to prolonged or frequent wetting other than humidity, and 2a. High strength bolts are used (e.g., yield strength > 150 ksi), or 2b. Molybdenum disulfide lubricants are used. At BVPS, most external surfaces are not subject to wetting. The BVPS position is that high strength bolts are made of A325 or A490, and BVPS has not identified these materials in any Reactor Vessel, Vessel Internals, or Reactor Coolant System mechanical closure bolting. BVPS does not use molybdenum disulfide thread lubricants.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1					
Item Number	**Component**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
					BVPS did not identify loss of preload as an aging effect for closure bolting. However, BVPS assigned the Bolting Integrity (B.2.6) Program to manage aging of in-scope bolting. The Bolting Integrity Program is consistent with NUREG-1801.
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	Not applicable. BVPS has no steel components of the Class 1 Reactor Vessel, Vessel Internals, or Reactor Coolant System 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. BVPS has no copper alloy components in the Class 1 Reactor Vessel, Vessel Internals, or Reactor Coolant System.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-55	Cast austenitic stainless steel Class 1 pump casings, and valve bodies and bonnets exposed to reactor coolant >250°C (>482°F)	Loss of fracture toughness due to thermal aging embrittlement	Inservice inspection (IWB, IWC, and IWD). Thermal aging susceptibility screening is not necessary, inservice inspection requirements are sufficient for managing these aging effects. ASME Code Case N-481 also provides an alternative for pump casings.	No	Consistent with NUREG-1801, with an AMP exception. BVPS manages the aging effect with the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2) Program. ASME Code Case N-481 has been deleted, and its requirements have been incorporated into the ASME Code.
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. BVPS has no copper alloy components in the Class 1 Reactor Vessel, Vessel Internals, or Reactor Coolant System.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1					
Item Number	**Component**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
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. BVPS manages the aging effect with the Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) (B.2.41) Program.
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, with the addition of bolting components. BVPS manages the aging effect with the Boric Acid Corrosion (B.2.7) Program.
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	Not applicable. BVPS addresses loss of material for steam generator components exposed to secondary feedwater/ steam in Item 3.1.1-16, Item 3.1.1-32, and Item 3.1.1-76.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1					
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, with additional components. BVPS manages the aging effect with the Flux Thimble Tube Inspection (B.2.19) Program.
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	Consistent with NUREG-1801, with an AMP exception. BVPS manages the aging effect with the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2) Program.
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	Not applicable. No BVPS AMR line item(s) roll up to this item. Cracking of stainless steel components exposed to reactor coolant is addressed in the evaluation of fatigue or SCC in other line items.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 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	Consistent with NUREG-1801, with an AMP exception. BVPS manages the aging effect with the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2) Program.
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	Consistent with NUREG-1801, with an AMP exception. BVPS manages the aging effect with a combination of the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2) and Water Chemistry (B.2.42) Programs.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1					
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	Consistent with NUREG-1801, with an AMP exception. BVPS manages the aging effect with a combination of the Water Chemistry (B.2.42), ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2), and Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Head (B.2.29) Programs.
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	Not applicable. This item is applicable only to once-through steam generators. The BVPS steam generators are recirculating, as described in UFSAR Sections 4.2.2.4 for Unit 1 and 5.4.2.4 for Unit 2, and not once-through.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1					
Item Number	**Component**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
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	Not applicable. Cracking of stainless steel or nickel components or cladding exposed to reactor coolant is addressed in the evaluation of fatigue or SCC in other line items.
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	Consistent with NUREG-1801, with additional components and an AMP exception. BVPS manages the aging effect with a combination of the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2), and Water Chemistry (B.2.42) Programs.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-69	Stainless steel, nickel alloy safety injection nozzles, safe ends, and associated welds and buttering exposed to reactor coolant	Cracking due to stress corrosion cracking, primary water stress corrosion cracking	Inservice Inspection (IWB, IWC, and IWD), and Water Chemistry	No	Consistent with NUREG-1801, with additional components and an AMP exception. BVPS manages the aging effect with a combination of the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2) and Water Chemistry (B.2.42) Programs.
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	Consistent with NUREG-1801, with an AMP exception. BVPS manages the aging effect with a combination of the Water Chemistry (B.2.42), ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2), and One-Time Inspection of ASME Code Class 1 Small Bore Piping (B.2.31) Programs.
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, with an AMP exception. BVPS manages the aging effects with the Reactor Head Closure Studs (B.2.34) Program.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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. BVPS manages the aging effects with a combination of the Steam Generator Tube Integrity (B.2.38) and Water Chemistry (B.2.42) Programs.
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. BVPS manages the aging effect with a combination of the Steam Generator Tube Integrity (B.2.38) and Water Chemistry (B.2.42) Programs.
3.1.1-74	Chrome plated steel, stainless steel, nickel alloy steam generator anti-vibration bars exposed to secondary feedwater/ steam	Cracking due to stress corrosion cracking, loss of material due to crevice corrosion and fretting	Steam Generator Tube Integrity and Water Chemistry	No	Consistent with NUREG-1801, with additional components. BVPS manages the aging effect with a combination of the Steam Generator Tube Integrity (B.2.38) and Water Chemistry (B.2.42) Programs. Steam generator flow limiters and Unit 1 steam generator feed ring spray nozzles, tube support plates, and thermal sleeves have been included here.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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 item is applicable only to once-through steam generators. The BVPS steam generators are recirculating, as described in UFSAR Sections 4.2.2.4 for Unit 1 and 5.4.2.4 for Unit 2, and not once-through.
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, with additional components. BVPS manages the aging effects with a combination of the Steam Generator Tube Integrity (B.2.38) and Water Chemistry (B.2.42) Programs. The tubesheets, feed rings, as well as the Unit 2 steam generator J-tubes, stayrods, and thermal sleeves have been included here.
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. BVPS does not use phosphate chemistry.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 1					
Item Number	**Component**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
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 BVPS steam generators have tube support plates instead of 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	Consistent with NUREG-1801. BVPS manages the aging effect with a combination of the Steam Generator Tube Integrity (B.2.38) and Water Chemistry (B.2.42) Programs.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 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. BVPS manages the aging effect with the Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) (B.2.40) Program.
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. BVPS manages the aging effect with the Water Chemistry (B.2.42) Program.
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 fabricated from nickel alloy. See Item 3.1.1-81.

Table 3.1.1 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 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, with additional components. BVPS manages the aging effect with the Water Chemistry (B.2.42) Program.
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	Not applicable. This item is applicable only to once-through steam generators. The BVPS steam generators are recirculating, as described in UFSAR Sections 4.2.2.4 for Unit 1 and 5.4.2.4 for Unit 2, and not once-through.
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 (continued): Reactor Vessel, Vessel Internals, and Reactor Coolant System, NUREG-1801 Volume 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. BVPS has no components within the scope of license renewal in concrete in the Reactor Vessel, Internals, or Reactor Coolant Systems.

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

Table 3.1.2-1 : Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Bottom-mounted guide tube	Pressure boundary and Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-1 (RP-13)	3.1.1-23	E
2	Bottom-mounted guide tube	Pressure boundary and Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	One-Time Inspection (B.2.30)	IV.A2-1 (RP-13)	3.1.1-23	E
3	Bottom-mounted guide tube	Pressure boundary and Structural/ Functional support	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
4	Bottom-mounted guide tube	Pressure boundary and Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
5	Bottom-mounted guide tube	Pressure boundary and Structural/ Functional support	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
6	Bottom-mounted guide tube (seal table)	Pressure boundary and Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-11 (R-76)	3.1.1-34	D
7	Bottom-mounted guide tube (seal table)	Pressure boundary and Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-11 (R-76)	3.1.1-34	C

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
8	Bottom-mounted guide tube (seal table)	Pressure boundary and Structural/ Functional support	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
9	Bottom-mounted guide tube (seal table)	Pressure boundary and Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
10	Bottom-mounted guide tube (seal table)	Pressure boundary and Structural/ Functional support	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
11	Bottom-mounted guide tube (thimble tube, plugs)	Pressure boundary and Structural/ Functional support	Stainless steel	Air with reactor coolant leakage	None	None	IV.E-3 (RP-05)	3.1.1-86	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
12	Bottom-mounted guide tube (thimble tube, plugs)	Pressure boundary and Structural/ Functional support	Stainless steel	Reactor coolant-EXT	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-11 (R-76)	3.1.1-34	D
13	Bottom-mounted guide tube (thimble tube, plugs)	Pressure boundary and Structural/ Functional support	Stainless steel	Reactor coolant-EXT	Cracking	Water Chemistry (B.2.42)	IV.A2-11 (R-76)	3.1.1-34	C
14	Bottom-mounted guide tube (thimble tube, plugs)	Pressure boundary and Structural/ Functional support	Stainless steel	Reactor coolant-EXT	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
15	Bottom-mounted guide tube (thimble tube, plugs)	Pressure boundary and Structural/ Functional support	Stainless steel	Reactor coolant-EXT	Loss of material	Flux Thimble Tube Inspection (B.2.19)	IV.B2-13 (R-145)	3.1.1-60	C

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
16	Bottom-mounted guide tube (thimble tube, plugs)	Pressure boundary and Structural/ Functional support	Stainless steel	Reactor coolant-EXT	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
17	Closure head	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-11 (R-76)	3.1.1-34	C
18	Closure head	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-11 (R-76)	3.1.1-34	D
19	Closure head	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
20	Closure head	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A

Table 3.1.2-1 (continued): Reactor Vessel									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
21	Closure head	Pressure boundary	Steel with stainless steel cladding	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.A2-13 (R-17)	3.1.1-58	A
22	Closure head (flange)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-11 (R-76)	3.1.1-34	D
23	Closure head (flange)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-11 (R-76)	3.1.1-34	C
24	Closure head (flange)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
25	Closure head (flange)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-25 (R-87)	3.1.1-63	B

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
26	Closure head (flange)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
27	Closure head (flange)	Pressure boundary	Steel with stainless steel cladding	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.A2-13 (R-17)	3.1.1-58	A
28	Closure head (lifting lugs)	Structural/ Functional support	Steel	Air with borated water leakage-EXT	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	N/A	N/A	H
29	Closure head (lifting lugs)	Structural/ Functional support	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.A2-13 (R-17)	3.1.1-58	A
30	Closure head (stud assembly)	Pressure boundary	High-strength low-alloy steel	Air with reactor coolant leakage-EXT	Cracking	Reactor Head Closure Studs (B.2.34)	IV.A2-2 (R-71)	3.1.1-71	B
31	Closure head (stud assembly)	Pressure boundary	High-strength low-alloy steel	Air with reactor coolant leakage-EXT	Cumulative fatigue damage	TLAA	IV.A2-4 (R-73)	3.1.1-07	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
32	Closure head (stud assembly)	Pressure boundary	High-strength low-alloy steel	Air with reactor coolant leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.A2-13 (R-17)	3.1.1-58	A
33	Closure head (stud assembly)	Pressure boundary	High-strength low-alloy steel	Air with reactor coolant leakage-EXT	Loss of material	Reactor Head Closure Studs (B.2.34)	IV.A2-3 (R-72)	3.1.1-71	B
34	Core support pad and guide lug	Structural/ Functional support	Nickel alloy	Reactor coolant-EXT	Cracking	Water Chemistry (B.2.42)	IV.A2-12 (R-88)	3.1.1-31	A
35	Core support pad and guide lug	Structural/ Functional support	Nickel alloy	Reactor coolant-EXT	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-12 (R-88)	3.1.1-31	B
36	Core support pad and guide lug	Structural/ Functional support	Nickel alloy	Reactor coolant-EXT	Cracking	Nickel-Alloy Nozzles and Penetrations (B.2.28)	IV.A2-12 (R-88)	3.1.1-31	A
37	Core support pad and guide lug	Structural/ Functional support	Nickel alloy	Reactor coolant-EXT	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
38	Core support pad and guide lug	Structural/ Functional support	Nickel alloy	Reactor coolant-EXT	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
39	Head penetration (core exit T/C nozzle assembly)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-11 (R-76)	3.1.1-34	B
40	Head penetration (core exit T/C nozzle assembly)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-11 (R-76)	3.1.1-34	A
41	Head penetration (core exit T/C nozzle assembly)	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
42	Head penetration (core exit T/C nozzle assembly)	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
43	Head penetration (core exit T/C nozzle assembly)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
44	Head penetration (CRDM housing adaptor flange)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-11 (R-76)	3.1.1-34	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
45	Head penetration (CRDM housing adaptor flange)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-11 (R-76)	3.1.1-34	B
46	Head penetration (CRDM housing adaptor flange)	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
47	Head penetration (CRDM housing adaptor flange)	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
48	Head penetration (CRDM housing adaptor flange)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
49	Head penetration (CRDM housing)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-11 (R-76)	3.1.1-34	B
50	Head penetration (CRDM housing)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-11 (R-76)	3.1.1-34	A
51	Head penetration (CRDM housing)	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
52	Head penetration (CRDM housing)	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
53	Head penetration (CRDM housing)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
54	Head penetration (CRDM nozzle and weld)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-9 (R-75)	3.1.1-65	B
55	Head penetration (CRDM nozzle and weld)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-9 (R-75)	3.1.1-65	A
56	Head penetration (CRDM nozzle and weld)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Head (B.2.29)	IV.A2-9 (R-75)	3.1.1-65	A
57	Head penetration (CRDM nozzle and weld)	Pressure boundary	Nickel alloy	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
58	Head penetration (CRDM nozzle and weld)	Pressure boundary	Nickel alloy	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
59	Head penetration (CRDM nozzle and weld)	Pressure boundary	Nickel alloy	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A, 102
60	Head penetration (Unit 2 CRDM latch housing)	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-11 (R-76)	3.1.1-34	B
61	Head penetration (Unit 2 CRDM latch housing)	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Cracking	Water Chemistry (B.2.42)	IV.A2-11 (R-76)	3.1.1-34	A
62	Head penetration (Unit 2 CRDM latch housing)	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
63	Head penetration (Unit 2 CRDM latch housing)	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Loss of fracture toughness	Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) (B.2.41)	IV.A2-10 (R-77)	3.1.1-57	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
64	Head penetration (Unit 2 CRDM latch housing)	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
65	Head penetration (Unit 2 CRDM latch housing)	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
66	Nozzle (inlet/ outlet safe end)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-15 (R-83)	3.1.1-69	B
67	Nozzle (inlet/ outlet safe end)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-15 (R-83)	3.1.1-69	A
68	Nozzle (inlet/ outlet safe end)	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
69	Nozzle (inlet/ outlet safe end)	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
70	Nozzle (inlet/ outlet safe end)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
71	Nozzle (support pad)	Structural/ Functional support	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.A2-13 (R-17)	3.1.1-58	A
72	Nozzle (Unit 1 inlet/outlet safe end weld)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-15 (R-83)	3.1.1-69	A
73	Nozzle (Unit 1 inlet/outlet safe end weld)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-15 (R-83)	3.1.1-69	B
74	Nozzle (Unit 1 inlet/outlet safe end weld)	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
75	Nozzle (Unit 1 inlet/outlet safe end weld)	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
76	Nozzle (Unit 1 inlet/outlet safe end weld)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
77	Nozzle (Unit 1 inlet/outlet)	Pressure boundary	SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Reactor coolant and neutron flux	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-11 (R-76)	3.1.1-34	D
78	Nozzle (Unit 1 inlet/outlet)	Pressure boundary	SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Reactor coolant and neutron flux	Cracking	TLAA	IV.A2-22 (R-85)	3.1.1-21	C

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
79	Nozzle (Unit 1 inlet/outlet)	Pressure boundary	SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Reactor coolant and neutron flux	Cracking	Water Chemistry (B.2.42)	IV.A2-11 (R-76)	3.1.1-34	C
80	Nozzle (Unit 1 inlet/outlet)	Pressure boundary	SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Reactor coolant and neutron flux	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
81	Nozzle (Unit 1 inlet/outlet)	Pressure boundary	SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Reactor coolant and neutron flux	Loss of fracture toughness	TLAA	IV.A2-16 (R-81)	3.1.1-17	A
82	Nozzle (Unit 1 inlet/outlet)	Pressure boundary	SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Reactor coolant and neutron flux	Loss of fracture toughness	Reactor Vessel Integrity (B.2.35)	IV.A2-17 (R-82)	3.1.1-18	E, 104

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
83	Nozzle (Unit 1 inlet/outlet)	Pressure boundary	SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Reactor coolant and neutron flux	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
84	Nozzle (Unit 1 inlet/outlet)	Pressure boundary	SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.A2-13 (R-17)	3.1.1-58	A
85	Nozzle (Unit 2 inlet/outlet safe end weld)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-13 (RP-31)	3.1.1-31	B

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
86	Nozzle (Unit 2 inlet/outlet safe end weld)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Nickel-Alloy Nozzles and Penetrations (B.2.28)	IV.C2-13 (RP-31)	3.1.1-31	A
87	Nozzle (Unit 2 inlet/outlet safe end weld)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-13 (RP-31)	3.1.1-31	A
88	Nozzle (Unit 2 inlet/outlet safe end weld)	Pressure boundary	Nickel alloy	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
89	Nozzle (Unit 2 inlet/outlet safe end weld)	Pressure boundary	Nickel alloy	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
90	Nozzle (Unit 2 inlet/outlet safe end weld)	Pressure boundary	Nickel alloy	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A, 102
91	Nozzle (Unit 2 inlet/outlet)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant and neutron flux	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-11 (R-76)	3.1.1-34	D
92	Nozzle (Unit 2 inlet/outlet)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant and neutron flux	Cracking	Water Chemistry (B.2.42)	IV.A2-11 (R-76)	3.1.1-34	C

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
93	Nozzle (Unit 2 inlet/outlet)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant and neutron flux	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
94	Nozzle (Unit 2 inlet/outlet)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant and neutron flux	Loss of fracture toughness	Reactor Vessel Integrity (B.2.35)	IV.A2-17 (R-82)	3.1.1-18	E, 104
95	Nozzle (Unit 2 inlet/outlet)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant and neutron flux	Loss of fracture toughness	TLAA	IV.A2-16 (R-81)	3.1.1-17	A
96	Nozzle (Unit 2 inlet/outlet)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant and neutron flux	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
97	Nozzle (Unit 2 inlet/outlet)	Pressure boundary	Steel with stainless steel cladding	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.A2-13 (R-17)	3.1.1-58	A
98	Penetration (bottom - instrument tube)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-19 (R-89)	3.1.1-31	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
99	Penetration (bottom - instrument tube)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-19 (R-89)	3.1.1-31	B
100	Penetration (bottom - instrument tube)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Nickel-Alloy Nozzles and Penetrations (B.2.28)	IV.A2-19 (R-89)	3.1.1-31	A
101	Penetration (bottom - instrument tube)	Pressure boundary	Nickel alloy	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
102	Penetration (bottom - instrument tube)	Pressure boundary	Nickel alloy	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
103	Penetration (bottom - instrument tube)	Pressure boundary	Nickel alloy	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A, 102
104	Penetration (safe end - bottom inst, Unit 2 RVLIS)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-15 (R-83)	3.1.1-69	D

Table 3.1.2-1 (continued): Reactor Vessel									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
105	Penetration (safe end - bottom inst, Unit 2 RVLIS)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-15 (R-83)	3.1.1-69	C
106	Penetration (safe end - bottom inst, Unit 2 RVLIS)	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
107	Penetration (safe end - bottom inst, Unit 2 RVLIS)	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
108	Penetration (safe end - bottom inst, Unit 2 RVLIS)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
109	Penetration (top - RVLIS and Unit 1 head vent)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Head (B.2.29)	IV.A2-18 (R-90)	3.1.1-65	A
110	Penetration (top - RVLIS and Unit 1 head vent)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-18 (R-90)	3.1.1-65	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
111	Penetration (top - RVLIS and Unit 1 head vent)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-18 (R-90)	3.1.1-65	B
112	Penetration (top - RVLIS and Unit 1 head vent)	Pressure boundary	Nickel alloy	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
113	Penetration (top - RVLIS and Unit 1 head vent)	Pressure boundary	Nickel alloy	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
114	Penetration (top - RVLIS and Unit 1 head vent)	Pressure boundary	Nickel alloy	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A, 102
115	Refueling seal ledge ring	Pressure boundary	Steel	Air with borated water leakage-EXT	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	N/A	N/A	H
116	Refueling seal ledge ring	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.A2-13 (R-17)	3.1.1-58	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
117	Vessel shell (bottom head)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-11 (R-76)	3.1.1-34	D
118	Vessel shell (bottom head)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-11 (R-76)	3.1.1-34	C
119	Vessel shell (bottom head)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
120	Vessel shell (bottom head)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
121	Vessel shell (bottom head)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.A2-13 (R-17)	3.1.1-58	A
122	Vessel shell (flange leak detection tube)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-19 (R-89)	3.1.1-31	D
123	Vessel shell (flange leak detection tube)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Nickel-Alloy Nozzles and Penetrations (B.2.28)	IV.A2-19 (R-89)	3.1.1-31	C
124	Vessel shell (flange leak detection tube)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-19 (R-89)	3.1.1-31	C
125	Vessel shell (flange leak detection tube)	Pressure boundary	Nickel alloy	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
126	Vessel shell (flange leak detection tube)	Pressure boundary	Nickel alloy	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
127	Vessel shell (flange leak detection tube)	Pressure boundary	Nickel alloy	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A, 102
128	Vessel shell (Unit 1 flange)	Pressure boundary and Structural/ Functional support	SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-11 (R-76)	3.1.1-34	D
129	Vessel shell (Unit 1 flange)	Pressure boundary and Structural/ Functional support	SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-11 (R-76)	3.1.1-34	C

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
130	Vessel shell (Unit 1 flange)	Pressure boundary and Structural/ Functional support	SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Reactor coolant	Cracking	TLAA	IV.A2-22 (R-85)	3.1.1-21	C
131	Vessel shell (Unit 1 flange)	Pressure boundary and Structural/ Functional support	SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
132	Vessel shell (Unit 1 flange)	Pressure boundary and Structural/ Functional support	SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Reactor coolant	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-25 (R-87)	3.1.1-63	B
133	Vessel shell (Unit 1 flange)	Pressure boundary and Structural/ Functional support	SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
134	Vessel shell (Unit 1 flange)	Pressure boundary and Structural/ Functional support	SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.A2-13 (R-17)	3.1.1-58	A
135	Vessel shell (Unit 2 flange)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-11 (R-76)	3.1.1-34	D
136	Vessel shell (Unit 2 flange)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.A2-11 (R-76)	3.1.1-34	C

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
137	Vessel shell (Unit 2 flange)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Reactor coolant	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
138	Vessel shell (Unit 2 flange)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Reactor coolant	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-25 (R-87)	3.1.1-63	B
139	Vessel shell (Unit 2 flange)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
140	Vessel shell (Unit 2 flange)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.A2-13 (R-17)	3.1.1-58	A

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
141	Vessel shell (upper, inter, lower, beltline welds)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Reactor coolant and neutron flux	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.A2-11 (R-76)	3.1.1-34	D
142	Vessel shell (upper, inter, lower, beltline welds)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Reactor coolant and neutron flux	Cracking	Water Chemistry (B.2.42)	IV.A2-11 (R-76)	3.1.1-34	C
143	Vessel shell (upper, inter, lower, beltline welds)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Reactor coolant and neutron flux	Cumulative fatigue damage	TLAA	IV.A2-21 (R-219)	3.1.1-09	A
144	Vessel shell (upper, inter, lower, beltline welds)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Reactor coolant and neutron flux	Loss of fracture toughness	Reactor Vessel Integrity (B.2.35)	IV.A2-24 (R-86)	3.1.1-18	E, 104

Table 3.1.2-1 (continued): Reactor Vessel

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
145	Vessel shell (upper, inter, lower, beltline welds)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Reactor coolant and neutron flux	Loss of fracture toughness	TLAA	IV.A2-23 (R-84)	3.1.1-17	A
146	Vessel shell (upper, inter, lower, beltline welds)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Reactor coolant and neutron flux	Loss of material	Water Chemistry (B.2.42)	IV.A2-14 (RP-28)	3.1.1-83	A
147	Vessel shell (upper, inter, lower, beltline welds)	Pressure boundary and Structural/ Functional support	Steel with stainless steel cladding	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.A2-13 (R-17)	3.1.1-58	A

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

Table 3.1.2-2 : Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Core baffle/ former assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-4 (R-126)	3.1.1-33	A
2	Core baffle/ former assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-10 (R-125)	3.1.1-30	A
3	Core baffle/ former assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Cracking	Water Chemistry (B.2.42)	IV.B2-10 (R-125)	3.1.1-30	A
4	Core baffle/ former assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
5	Core baffle/ former assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Loss of fracture toughness	PWR Vessel Internals (B.2.33)	IV.B2-6 (R-128)	3.1.1-22	A
6	Core baffle/ former assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
7	Core baffle/ former assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Loss of preload	PWR Vessel Internals (B.2.33)	IV.B2-5 (R-129)	3.1.1-27	A
8	Core baffle/ former assembly (plates)	Structural/ Functional support and Direct flow	Stainless steel	Reactor coolant and neutron flux	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-1 (R-124)	3.1.1-33	A
9	Core baffle/ former assembly (plates)	Structural/ Functional support and Direct flow	Stainless steel	Reactor coolant and neutron flux	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-2 (R-123)	3.1.1-30	A
10	Core baffle/ former assembly (plates)	Structural/ Functional support and Direct flow	Stainless steel	Reactor coolant and neutron flux	Cracking	Water Chemistry (B.2.42)	IV.B2-2 (R-123)	3.1.1-30	A
11	Core baffle/ former assembly (plates)	Structural/ Functional support and Direct flow	Stainless steel	Reactor coolant and neutron flux	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
12	Core baffle/ former assembly (plates)	Structural/ Functional support and Direct flow	Stainless steel	Reactor coolant and neutron flux	Loss of fracture toughness	PWR Vessel Internals (B.2.33)	IV.B2-3 (R-127)	3.1.1-22	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
13	Core baffle/ former assembly (plates)	Structural/ Functional support and Direct flow	Stainless steel	Reactor coolant and neutron flux	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
14	Core barrel (shell, ring, flange, nozzle, thermal shield/ pad)	Structural/ Functional support, Direct flow and Radiation shielding	Stainless steel	Reactor coolant and neutron flux	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-7 (R-121)	3.1.1-33	A
15	Core barrel (shell, ring, flange, nozzle, thermal shield/ pad)	Structural/ Functional support, Direct flow and Radiation shielding	Stainless steel	Reactor coolant and neutron flux	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-8 (R120)	3.1.1-30	A
16	Core barrel (shell, ring, flange, nozzle, thermal shield/ pad)	Structural/ Functional support, Direct flow and Radiation shielding	Stainless steel	Reactor coolant and neutron flux	Cracking	Water Chemistry (B.2.42)	IV.B2-8 (R120)	3.1.1-30	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
17	Core barrel (shell, ring, flange, nozzle, thermal shield/ pad)	Structural/ Functional support, Direct flow and Radiation shielding	Stainless steel	Reactor coolant and neutron flux	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
18	Core barrel (shell, ring, flange, nozzle, thermal shield/ pad)	Structural/ Functional support, Direct flow and Radiation shielding	Stainless steel	Reactor coolant and neutron flux	Loss of fracture toughness	PWR Vessel Internals (B.2.33)	IV.B2-9 (R-122)	3.1.1-22	A
19	Core barrel (shell, ring, flange, nozzle, thermal shield/ pad)	Structural/ Functional support, Direct flow and Radiation shielding	Stainless steel	Reactor coolant and neutron flux	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
20	Core barrel assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-7 (R-121)	3.1.1-33	C

Table 3.1.2-2 (continued): Reactor Vessel Internals									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
21	Core barrel assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-8 (R120)	3.1.1-30	C
22	Core barrel assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Cracking	Water Chemistry (B.2.42)	IV.B2-8 (R120)	3.1.1-30	C
23	Core barrel assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
24	Core barrel assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Loss of fracture toughness	PWR Vessel Internals (B.2.33)	IV.B2-9 (R-122)	3.1.1-22	C
25	Core barrel assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
26	Core barrel assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Loss of preload	PWR Vessel Internals (B.2.33)	IV.B2-5 (R-129)	3.1.1-27	C
27	Instrumentation support structure (flux thimble guide tube)	Structural/ Functional support	Stainless steel	Reactor coolant	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-11 (R-144)	3.1.1-33	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
28	Instrumentation support structure (flux thimble guide tube)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-12 (R-143)	3.1.1-30	A
29	Instrumentation support structure (flux thimble guide tube)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.B2-12 (R-143)	3.1.1-30	A
30	Instrumentation support structure (flux thimble guide tube)	Structural/ Functional support	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
31	Instrumentation support structure (flux thimble guide tube)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
32	Instrumentation support structure (thermocouple conduit)	Structural/ Functional support	Stainless steel	Reactor coolant	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-11 (R-144)	3.1.1-33	C
33	Instrumentation support structure (thermocouple conduit)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-12 (R-143)	3.1.1-30	C

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
34	Instrumentation support structure (thermocouple conduit)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.B2-12 (R-143)	3.1.1-30	C
35	Instrumentation support structure (thermocouple conduit)	Structural/ Functional support	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
36	Instrumentation support structure (thermocouple conduit)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
37	Lower internals assembly (clevis insert bolt)	Structural/ Functional support	Nickel alloy	Reactor coolant and neutron flux	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-15 (R-134)	3.1.1-33	A
38	Lower internals assembly (clevis insert bolt)	Structural/ Functional support	Nickel alloy	Reactor coolant and neutron flux	Cracking	Water Chemistry (B.2.42)	IV.B2-16 (R-133)	3.1.1-37	A
39	Lower internals assembly (clevis insert bolt)	Structural/ Functional support	Nickel alloy	Reactor coolant and neutron flux	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-16 (R-133)	3.1.1-37	A
40	Lower internals assembly (clevis insert bolt)	Structural/ Functional support	Nickel alloy	Reactor coolant and neutron flux	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
41	Lower internals assembly (clevis insert bolt)	Structural/ Functional support	Nickel alloy	Reactor coolant and neutron flux	Loss of fracture toughness	PWR Vessel Internals (B.2.33)	IV.B2-17 (R-135)	3.1.1-22	A
42	Lower internals assembly (clevis insert bolt)	Structural/ Functional support	Nickel alloy	Reactor coolant and neutron flux	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
43	Lower internals assembly (clevis insert bolt)	Structural/ Functional support	Nickel alloy	Reactor coolant and neutron flux	Loss of preload	PWR Vessel Internals (B.2.33)	IV.B2-14 (R-137)	3.1.1-27	A
44	Lower internals assembly (clevis insert)	Structural/ Functional support	Nickel alloy	Reactor coolant	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-19 (R-131)	3.1.1-33	A
45	Lower internals assembly (clevis insert)	Structural/ Functional support	Nickel alloy	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.B2-20 (R-130)	3.1.1-37	A
46	Lower internals assembly (clevis insert)	Structural/ Functional support	Nickel alloy	Reactor coolant	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-20 (R-130)	3.1.1-37	A
47	Lower internals assembly (clevis insert)	Structural/ Functional support	Nickel alloy	Reactor coolant	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
48	Lower internals assembly (clevis insert)	Structural/ Functional support	Nickel alloy	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
49	Lower internals assembly (clevis insert)	Structural/ Functional support	Nickel alloy	Reactor coolant	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.B2-26 (R-142)	3.1.1-63	B, 102
50	Lower internals assembly (Core support forging and lower support column)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-23 (R-139)	3.1.1-33	A
51	Lower internals assembly (Core support forging and lower support column)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-24 (R-138)	3.1.1-30	A
52	Lower internals assembly (Core support forging and lower support column)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Cracking	Water Chemistry (B.2.42)	IV.B2-24 (R-138)	3.1.1-30	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
53	Lower internals assembly (Core support forging and lower support column)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
54	Lower internals assembly (Core support forging and lower support column)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Loss of fracture toughness	PWR Vessel Internals (B.2.33)	IV.B2-22 (R-141)	3.1.1-22	A
55	Lower internals assembly (Core support forging and lower support column)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
56	Lower internals assembly (fuel alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-15 (R-134)	3.1.1-33	A
57	Lower internals assembly (fuel alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Cracking	Water Chemistry (B.2.42)	IV.B2-16 (R-133)	3.1.1-37	A
58	Lower internals assembly (fuel alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-16 (R-133)	3.1.1-37	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
59	Lower internals assembly (fuel alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
60	Lower internals assembly (fuel alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Loss of fracture toughness	PWR Vessel Internals (B.2.33)	IV.B2-17 (R-135)	3.1.1-22	A
61	Lower internals assembly (fuel alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
62	Lower internals assembly (lower core plate)	Structural/ Functional support and Direct flow	Stainless steel	Reactor coolant and neutron flux	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-19 (R-131)	3.1.1-33	A
63	Lower internals assembly (lower core plate)	Structural/ Functional support and Direct flow	Stainless steel	Reactor coolant and neutron flux	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-20 (R-130)	3.1.1-37	A
64	Lower internals assembly (lower core plate)	Structural/ Functional support and Direct flow	Stainless steel	Reactor coolant and neutron flux	Cracking	Water Chemistry (B.2.42)	IV.B2-20 (R-130)	3.1.1-37	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
65	Lower internals assembly (lower core plate)	Structural/ Functional support and Direct flow	Stainless steel	Reactor coolant and neutron flux	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
66	Lower internals assembly (lower core plate)	Structural/ Functional support and Direct flow	Stainless steel	Reactor coolant and neutron flux	Loss of fracture toughness	PWR Vessel Internals (B.2.33)	IV.B2-18 (R-132)	3.1.1-22	A
67	Lower internals assembly (lower core plate)	Structural/ Functional support and Direct flow	Stainless steel	Reactor coolant and neutron flux	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
68	Lower internals assembly (lower support column bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-15 (R-134)	3.1.1-33	A
69	Lower internals assembly (lower support column bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-16 (R-133)	3.1.1-37	A
70	Lower internals assembly (lower support column bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Cracking	Water Chemistry (B.2.42)	IV.B2-16 (R-133)	3.1.1-37	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
71	Lower internals assembly (lower support column bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
72	Lower internals assembly (lower support column bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Loss of fracture toughness	PWR Vessel Internals (B.2.33)	IV.B2-17 (R-135)	3.1.1-22	A
73	Lower internals assembly (lower support column bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
74	Lower internals assembly (lower support column bolt)	Structural/ Functional support	Stainless steel	Reactor coolant and neutron flux	Loss of preload	PWR Vessel Internals (B.2.33)	IV.B2-25 (R-136)	3.1.1-27	A
75	Lower internals assembly (radial key)	Structural/ Functional support	Stainless steel	Reactor coolant	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-19 (R-131)	3.1.1-33	A
76	Lower internals assembly (radial key)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-20 (R-130)	3.1.1-37	A

Table 3.1.2-2 (continued): Reactor Vessel Internals									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
77	Lower internals assembly (radial key)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.B2-20 (R-130)	3.1.1-37	A
78	Lower internals assembly (radial key)	Structural/ Functional support	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
79	Lower internals assembly (radial key)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.B2-26 (R-142)	3.1.1-63	B
80	Lower internals assembly (radial key)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
81	Lower internals assembly (secondary core support, head/ vessel alignment pin, head cooling spray nozzle)	Structural/ Functional support	Stainless steel	Reactor coolant	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-23 (R-139)	3.1.1-33	C

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
82	Lower internals assembly (secondary core support, head/ vessel alignment pin, head cooling spray nozzle)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-24 (R-138)	3.1.1-30	C
83	Lower internals assembly (secondary core support, head/ vessel alignment pin, head cooling spray nozzle)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.B2-24 (R-138)	3.1.1-30	C
84	Lower internals assembly (secondary core support, head/ vessel alignment pin, head cooling spray nozzle)	Structural/ Functional support	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
85	Lower internals assembly (secondary core support, head/ vessel alignment pin, head cooling spray nozzle)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
86	Lower internals assembly (Unit 1 diffuser plate)	Direct flow	Stainless steel	Reactor coolant	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-19 (R-131)	3.1.1-33	C
87	Lower internals assembly (Unit 1 diffuser plate)	Direct flow	Stainless steel	Reactor coolant	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-20 (R-130)	3.1.1-37	C
88	Lower internals assembly (Unit 1 diffuser plate)	Direct flow	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.B2-20 (R-130)	3.1.1-37	C
89	Lower internals assembly (Unit 1 diffuser plate)	Direct flow	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
90	Lower internals assembly (Unit 1 diffuser plate)	Direct flow	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
91	Lower internals assembly (Unit 1 lower support column casting)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F) and neutron flux	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-23 (R-139)	3.1.1-33	A
92	Lower internals assembly (Unit 1 lower support column casting)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F) and neutron flux	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-24 (R-138)	3.1.1-30	A
93	Lower internals assembly (Unit 1 lower support column casting)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F) and neutron flux	Cracking	Water Chemistry (B.2.42)	IV.B2-24 (R-138)	3.1.1-30	A
94	Lower internals assembly (Unit 1 lower support column casting)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F) and neutron flux	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
95	Lower internals assembly (Unit 1 lower support column casting)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F) and neutron flux	Loss of fracture toughness	Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) (B.2.40)	IV.B2-21 (R-140)	3.1.1-80	A
96	Lower internals assembly (Unit 1 lower support column casting)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F) and neutron flux	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
97	RCCA guide tube assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-27 (R-119)	3.1.1-33	A
98	RCCA guide tube assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-28 (R-118)	3.1.1-37	A
99	RCCA guide tube assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.B2-28 (R-118)	3.1.1-37	A
100	RCCA guide tube assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A

Table 3.1.2-2 (continued): Reactor Vessel Internals									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
101	RCCA guide tube assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	PWR Vessel Internals (B.2.33)	IV.B2-32 (RP-24)	3.1.1-83	A
102	RCCA guide tube assembly (bolt)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of preload	PWR Vessel Internals (B.2.33)	IV.B2-38 (R-114)	3.1.1-27	C
103	RCCA guide tube assembly (guide tube)	Structural/ Functional support	Stainless steel	Reactor coolant	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-29 (R-117)	3.1.1-33	A
104	RCCA guide tube assembly (guide tube)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-30 (R-116)	3.1.1-30	A
105	RCCA guide tube assembly (guide tube)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.B2-30 (R-116)	3.1.1-30	A
106	RCCA guide tube assembly (guide tube)	Structural/ Functional support	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
107	RCCA guide tube assembly (guide tube)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
108	RCCA guide tube assembly (support pin)	Structural/ Functional support	Nickel alloy	Reactor coolant	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-27 (R-119)	3.1.1-33	A
109	RCCA guide tube assembly (support pin)	Structural/ Functional support	Nickel alloy	Reactor coolant	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-28 (R-118)	3.1.1-37	A
110	RCCA guide tube assembly (support pin)	Structural/ Functional support	Nickel alloy	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.B2-28 (R-118)	3.1.1-37	A
111	RCCA guide tube assembly (support pin)	Structural/ Functional support	Nickel alloy	Reactor coolant	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
112	RCCA guide tube assembly (support pin)	Structural/ Functional support	Nickel alloy	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
113	Upper internals assembly (Core plate alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-39 (R-113)	3.1.1-33	A
114	Upper internals assembly (Core plate alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.B2-40 (R-112)	3.1.1-37	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
115	Upper internals assembly (Core plate alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-40 (R-112)	3.1.1-37	A
116	Upper internals assembly (Core plate alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
117	Upper internals assembly (Core plate alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.B2-34 (R-115)	3.1.1-63	B
118	Upper internals assembly (Core plate alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
119	Upper internals assembly (fuel alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-39 (R-113)	3.1.1-33	A
120	Upper internals assembly (fuel alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-40 (R-112)	3.1.1-37	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
121	Upper internals assembly (fuel alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.B2-40 (R-112)	3.1.1-37	A
122	Upper internals assembly (fuel alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
123	Upper internals assembly (fuel alignment pin)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
124	Upper internals assembly (hold-down spring)	Structural/ Functional support	Stainless steel	Reactor coolant	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-41 (R-107)	3.1.1-33	A
125	Upper internals assembly (hold-down spring)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-42 (R-106)	3.1.1-30	A
126	Upper internals assembly (hold-down spring)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.B2-42 (R-106)	3.1.1-30	A
127	Upper internals assembly (hold-down spring)	Structural/ Functional support	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
128	Upper internals assembly (hold-down spring)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
129	Upper internals assembly (hold-down spring)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of preload	PWR Vessel Internals (B.2.33)	IV.B2-33 (R-108)	3.1.1-27	A
130	Upper internals assembly (support column mixer base)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F) and neutron flux	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-35 (R-110)	3.1.1-33	A
131	Upper internals assembly (support column mixer base)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F) and neutron flux	Cracking	Water Chemistry (B.2.42)	IV.B2-36 (R-109)	3.1.1-30	A
132	Upper internals assembly (support column mixer base)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F) and neutron flux	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-36 (R-109)	3.1.1-30	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
133	Upper internals assembly (support column mixer base)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F) and neutron flux	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
134	Upper internals assembly (support column mixer base)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F) and neutron flux	Loss of fracture toughness	Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) (B.2.40)	IV.B2-37 (R-111)	3.1.1-80	A
135	Upper internals assembly (support column mixer base)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F) and neutron flux	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
136	Upper internals assembly (support column)	Structural/ Functional support	Stainless steel	Reactor coolant	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-35 (R-110)	3.1.1-33	A
137	Upper internals assembly (support column)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-36 (R-109)	3.1.1-30	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
138	Upper internals assembly (support column)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.B2-36 (R-109)	3.1.1-30	A
139	Upper internals assembly (support column)	Structural/ Functional support	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
140	Upper internals assembly (support column)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
141	Upper internals assembly (upper core plate, upper support plate and support assembly)	Structural/ Functional support	Stainless steel	Reactor coolant	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-41 (R-107)	3.1.1-33	C
142	Upper internals assembly (upper core plate, upper support plate and support assembly)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-42 (R-106)	3.1.1-30	C

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
143	Upper internals assembly (upper core plate, upper support plate and support assembly)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.B2-42 (R-106)	3.1.1-30	C
144	Upper internals assembly (upper core plate, upper support plate and support assembly)	Structural/ Functional support	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
145	Upper internals assembly (upper core plate, upper support plate and support assembly)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
146	Upper internals assembly (upper support column bolt)	Structural/ Functional support	Stainless steel	Reactor coolant	Change in dimensions	PWR Vessel Internals (B.2.33)	IV.B2-39 (R-113)	3.1.1-33	A

Table 3.1.2-2 (continued): Reactor Vessel Internals

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
147	Upper internals assembly (upper support column bolt)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	PWR Vessel Internals (B.2.33)	IV.B2-40 (R-112)	3.1.1-37	A
148	Upper internals assembly (upper support column bolt)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.B2-40 (R-112)	3.1.1-37	A
149	Upper internals assembly (upper support column bolt)	Structural/ Functional support	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.B2-31 (R-53)	3.1.1-05	A
150	Upper internals assembly (upper support column bolt)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.B2-32 (RP-24)	3.1.1-83	A
151	Upper internals assembly (upper support column bolt)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of preload	PWR Vessel Internals (B.2.33)	IV.B2-38 (R-114)	3.1.1-27	A

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

Table 3.1.2-3 : Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	Cumulative fatigue damage	TLAA	IV.C2-10 (R-18)	3.1.1-07	A, 103
2	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
3	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Cumulative fatigue damage	TLAA	IV.C2-10 (R-18)	3.1.1-07	A, 103
4	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
5	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.C2-9 (R-17)	3.1.1-58	C
6	Bolting	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	Cumulative fatigue damage	TLAA	IV.C2-10 (R-18)	3.1.1-07	A, 103

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
7	Bolting	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
8	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Cumulative fatigue damage	TLAA	IV.C2-10 (R-18)	3.1.1-07	A, 103
9	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
10	Bolting	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.C2-9 (R-17)	3.1.1-58	C
11	Flexible hose (Unit 2 only)	Leakage boundary (spatial)	Nickel alloy	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A, 102
12	Flexible hose (Unit 2 only)	Leakage boundary (spatial)	Nickel alloy	Air - indoor uncontrolled-EXT	None	None	IV.E-1 (RP-03)	3.1.1-85	A
13	Flexible hose (Unit 2 only)	Leakage boundary (spatial)	Nickel alloy	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A, 102

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
14	Flexible hose (Unit 2 only)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-21 (R-06)	3.1.1-31	D
15	Flexible hose (Unit 2 only)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Nickel-Alloy Nozzles and Penetrations (B.2.28)	IV.C2-21 (R-06)	3.1.1-31	C
16	Flexible hose (Unit 2 only)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-21 (R-06)	3.1.1-31	C
17	Flexible hose (Unit 2 only)	Pressure boundary	Nickel alloy	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
18	Flexible hose (Unit 2 only)	Pressure boundary	Nickel alloy	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
19	Flexible hose (Unit 2 only)	Pressure boundary	Nickel alloy	Air - indoor uncontrolled-EXT	None	None	IV.E-1 (RP-03)	3.1.1-85	A
20	Flexible hose (Unit 2 only)	Pressure boundary	Nickel alloy	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A, 102

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
21	Heat exchanger (Unit 1 regen shell and channel)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	One-Time Inspection (B.2.30)	IV.C2-17 (R-24)	3.1.1-36	C
22	Heat exchanger (Unit 1 regen shell and channel)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-17 (R-24)	3.1.1-36	C
23	Heat exchanger (Unit 1 regen shell and channel)	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	C
24	Heat exchanger (Unit 1 regen shell and channel)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A
25	Heat exchanger (Unit 1 regen shell and channel)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
26	Heat exchanger (Unit 1 regen tube)	Pressure boundary and Heat transfer	Stainless steel	Reactor coolant	Cracking	One-Time Inspection (B.2.30)	IV.C2-17 (R-24)	3.1.1-36	C

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
27	Heat exchanger (Unit 1 regen tube)	Pressure boundary and Heat transfer	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-17 (R-24)	3.1.1-36	C
28	Heat exchanger (Unit 1 regen tube)	Pressure boundary and Heat transfer	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	C
29	Heat exchanger (Unit 1 regen tube)	Pressure boundary and Heat transfer	Stainless steel	Reactor coolant	Reduction of heat transfer	One-Time Inspection (B.2.30)	N/A	N/A	H
30	Heat exchanger (Unit 1 regen tube)	Pressure boundary and Heat transfer	Stainless steel	Reactor coolant	Reduction of heat transfer	Water Chemistry (B.2.42)	N/A	N/A	H
31	Heat exchanger (Unit 1 regen tube)	Pressure boundary and Heat transfer	Stainless steel	Reactor coolant-EXT	Cracking	One-Time Inspection (B.2.30)	IV.C2-17 (R-24)	3.1.1-36	C
32	Heat exchanger (Unit 1 regen tube)	Pressure boundary and Heat transfer	Stainless steel	Reactor coolant-EXT	Cracking	Water Chemistry (B.2.42)	IV.C2-17 (R-24)	3.1.1-36	C

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
33	Heat exchanger (Unit 1 regen tube)	Pressure boundary and Heat transfer	Stainless steel	Reactor coolant-EXT	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	C
34	Heat exchanger (Unit 1 regen tube)	Pressure boundary and Heat transfer	Stainless steel	Reactor coolant-EXT	Reduction of heat transfer	One-Time Inspection (B.2.30)	N/A	N/A	H
35	Heat exchanger (Unit 1 regen tube)	Pressure boundary and Heat transfer	Stainless steel	Reactor coolant-EXT	Reduction of heat transfer	Water Chemistry (B.2.42)	N/A	N/A	H
36	Heat exchanger (Unit 1 regen tubesheet)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-17 (R-24)	3.1.1-36	C
37	Heat exchanger (Unit 1 regen tubesheet)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	One-Time Inspection (B.2.30)	IV.C2-17 (R-24)	3.1.1-36	C
38	Heat exchanger (Unit 1 regen tubesheet)	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	C
39	Heat exchanger (Unit 1 regen tubesheet)	Pressure boundary	Stainless steel	Reactor coolant-EXT	Cracking	One-Time Inspection (B.2.30)	IV.C2-17 (R-24)	3.1.1-36	C

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
40	Heat exchanger (Unit 1 regen tubesheet)	Pressure boundary	Stainless steel	Reactor coolant-EXT	Cracking	Water Chemistry (B.2.42)	IV.C2-17 (R-24)	3.1.1-36	C
41	Heat exchanger (Unit 1 regen tubesheet)	Pressure boundary	Stainless steel	Reactor coolant-EXT	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	C
42	Hydraulic isolator	Pressure boundary	Stainless steel	Reactor coolant	Cracking	One-Time Inspection (B.2.30)	IV.C2-17 (R-24)	3.1.1-36	C
43	Hydraulic isolator	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-17 (R-24)	3.1.1-36	C
44	Hydraulic isolator	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
45	Hydraulic isolator	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
46	Hydraulic isolator	Pressure boundary	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	N/A	N/A	G
47	Hydraulic isolator	Pressure boundary	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	N/A	N/A	G
48	Hydraulic isolator	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
49	Hydraulic isolator	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
50	Orifice	Pressure boundary and Flow restriction	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-2 (R-07)	3.1.1-68	B
51	Orifice	Pressure boundary and Flow restriction	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-2 (R-07)	3.1.1-68	A
52	Orifice	Pressure boundary and Flow restriction	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
53	Orifice	Pressure boundary and Flow restriction	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
54	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
55	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
56	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Gas	None	None	IV.E-5 (RP-07)	3.1.1-86	A
57	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Reactor coolant	Cracking	One-Time Inspection (B.2.30)	IV.C2-17 (R-24)	3.1.1-36	C
58	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-17 (R-24)	3.1.1-36	C

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
59	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
60	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
61	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A

Table 3.1.2-3 (continued): Reactor Coolant System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
62	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	N/A	N/A	G
63	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	N/A	N/A	G
64	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
65	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
66	Piping	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-3 (R-05)	3.1.1-24	E
67	Piping	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Cracking	Water Chemistry (B.2.42)	IV.C2-3 (R-05)	3.1.1-24	E
68	Piping	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
69	Piping	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Loss of fracture toughness	Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) (B.2.41)	IV.C2-4 (R-52)	3.1.1-57	A

Table 3.1.2-3 (continued): Reactor Coolant System									
Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
70	Piping	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
71	Piping	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A
72	Piping	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
73	Piping	Pressure boundary	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-2 (R-07)	3.1.1-68	B
74	Piping	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-2 (R-07)	3.1.1-68	A
75	Piping	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
76	Piping	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
77	Piping	Pressure boundary	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	N/A	N/A	G
78	Piping	Pressure boundary	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	N/A	N/A	G
79	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A
80	Piping	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
81	Piping (less than 4 inch diameter)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-1 (R-02)	3.1.1-70	B
82	Piping (less than 4 inch diameter)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	One-Time Inspection of ASME Code Class 1 Small Bore Piping (B.2.31)	IV.C2-1 (R-02)	3.1.1-70	A
83	Piping (less than 4 inch diameter)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-1 (R-02)	3.1.1-70	A
84	Piping (less than 4 inch diameter)	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
85	Piping (less than 4 inch diameter)	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
86	Piping (less than 4 inch diameter)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A
87	Piping (N_2 supply)	Pressure boundary	Steel	Gas	None	None	VII.J-23 (AP-6)	3.3.1-97	A
88	Piping (N_2 supply)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
89	Piping (N_2 supply)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.C2-9 (R-17)	3.1.1-58	A
90	Piping (Unit 1 N_2 supply)	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Gas	None	None	VII.J-23 (AP-6)	3.3.1-97	A

Table 3.1.2-3 (continued): Reactor Coolant System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	***NUREG-* 1801 Volume 2 Item**	**Table 1 Item**	**Notes**
91	Piping (Unit 1 N_2 supply)	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
92	Piping (Unit 1 N_2 supply)	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.C2-9 (R-17)	3.1.1-58	A
93	Pressurizer (heater & instrument nozzle, safe end)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-19 (R-25)	3.1.1-64	B
94	Pressurizer (heater & instrument nozzle, safe end)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-19 (R-25)	3.1.1-64	A

Table 3.1.2-3 (continued): Reactor Coolant System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
95	Pressurizer (heater & instrument nozzle, safe end)	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
96	Pressurizer (heater & instrument nozzle, safe end)	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
97	Pressurizer (heater & instrument nozzle, safe end)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A
98	Pressurizer (heater & instrument nozzle, safe end)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
99	Pressurizer (heater sheath)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-20 (R-217)	3.1.1-68	B
100	Pressurizer (heater sheath)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-20 (R-217)	3.1.1-68	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
101	Pressurizer (heater sheath)	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
102	Pressurizer (heater sheath)	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
103	Pressurizer (heater sheath)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A
104	Pressurizer (heater sheath)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
105	Pressurizer (manway cover)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Cumulative fatigue damage	TLAA	IV.C2-10 (R-18)	3.1.1-07	A, 103
106	Pressurizer (manway cover)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.C2-9 (R-17)	3.1.1-58	A
107	Pressurizer (manway insert, thermal sleeve)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-19 (R-25)	3.1.1-64	B

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
108	Pressurizer (manway insert, thermal sleeve)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-19 (R-25)	3.1.1-64	A
109	Pressurizer (manway insert, thermal sleeve)	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
110	Pressurizer (manway insert, thermal sleeve)	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
111	Pressurizer (safe end welds)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-24 (RP-22)	3.1.1-31	B
112	Pressurizer (safe end welds)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Nickel-Alloy Nozzles and Penetrations (B.2.28)	IV.C2-24 (RP-22)	3.1.1-31	A
113	Pressurizer (safe end welds)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-24 (RP-22)	3.1.1-31	A
114	Pressurizer (safe end welds)	Pressure boundary	Nickel alloy	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
115	Pressurizer (safe end welds)	Pressure boundary	Nickel alloy	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A

Table 3.1.2-3 (continued): Reactor Coolant System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	***NUREG-*1801 Volume 2 Item**	**Table 1 Item**	**Notes**
116	Pressurizer (safe end welds)	Pressure boundary	Nickel alloy	Air - indoor uncontrolled-EXT	None	None	IV.E-1 (RP-03)	3.1.1-85	A
117	Pressurizer (safe end welds)	Pressure boundary	Nickel alloy	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A, 102
118	Pressurizer (shell, heads, nozzles > 3 inches)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-19 (R-25)	3.1.1-64	B
119	Pressurizer (shell, heads, nozzles > 3 inches)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-19 (R-25)	3.1.1-64	A
120	Pressurizer (shell, heads, nozzles > 3 inches)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
121	Pressurizer (shell, heads, nozzles > 3 inches)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
122	Pressurizer (shell, heads, nozzles > 3 inches)	Pressure boundary	Steel with stainless steel cladding	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.C2-9 (R-17)	3.1.1-58	A
123	Pressurizer (skirt, seismic lug, valve support lug	Structural/ Functional support	Steel	Air - indoor uncontrolled-EXT	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-16 (RP-19)	3.1.1-61	B, 103
124	Pressurizer (skirt, seismic lug, valve support lug	Structural/ Functional support	Steel	Air - indoor uncontrolled-EXT	Cumulative fatigue damage	TLAA	IV.C2-10 (R-18)	3.1.1-07	A, 103
125	Pressurizer (skirt, seismic lug, valve support lug	Structural/ Functional support	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.C2-9 (R-17)	3.1.1-58	A
126	Pressurizer (spray head coupling and locking bar)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	One-Time Inspection (B.2.30)	IV.C2-17 (R-24)	3.1.1-36	A
127	Pressurizer (spray head coupling and locking bar)	Structural/ Functional support	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-17 (R-24)	3.1.1-36	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
128	Pressurizer (spray head coupling and locking bar)	Structural/ Functional support	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
129	Pressurizer (spray head coupling and locking bar)	Structural/ Functional support	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
130	Pressurizer (spray head)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Cracking	Water Chemistry (B.2.42)	IV.C2-17 (R-24)	3.1.1-36	A
131	Pressurizer (spray head)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Cracking	One-Time Inspection (B.2.30)	IV.C2-17 (R-24)	3.1.1-36	A
132	Pressurizer (spray head)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
133	Pressurizer (spray head)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Loss of fracture toughness	Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) (B.2.41)	IV.C2-4 (R-52)	3.1.1-57	A
134	Pressurizer (spray head)	Structural/ Functional support	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
135	Pressurizer relief tank	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Gas	None	None	VII.J-23 (AP-6)	3.3.1-97	A
136	Pressurizer relief tank	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	N/A	N/A	G, 101

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
137	Pressurizer relief tank	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Treated water	Loss of material	Water Chemistry (B.2.42)	N/A	N/A	G, 101
138	Pressurizer relief tank	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
139	Pressurizer relief tank	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.C2-9 (R-17)	3.1.1-58	A
140	Pressurizer relief tank (rupture disk)	Leakage boundary (spatial)	Stainless steel	Gas	None	None	IV.E-5 (RP-07)	3.1.1-86	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
141	Pressurizer relief tank (rupture disk)	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A
142	Pressurizer relief tank (rupture disk)	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
143	Pressurizer relief tank (rupture disk)	Leakage boundary (spatial)	Steel	Gas	None	None	VII.J-23 (AP-6)	3.3.1-97	A
144	Pressurizer relief tank (rupture disk)	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
145	Pressurizer relief tank (rupture disk)	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.C2-9 (R-17)	3.1.1-58	A
146	Reactor coolant pump (casing and main flange)	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-5 (R-09)	3.1.1-68	B
147	Reactor coolant pump (casing and main flange)	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Cracking	Water Chemistry (B.2.42)	IV.C2-5 (R-09)	3.1.1-68	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
148	Reactor coolant pump (casing and main flange)	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
149	Reactor coolant pump (casing and main flange)	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Loss of fracture toughness	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-6 (R-08)	3.1.1-55	B
150	Reactor coolant pump (casing and main flange)	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
151	Reactor coolant pump (casing and main flange)	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A
152	Reactor coolant pump (casing and main flange)	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
153	Reactor coolant pump (thermal barrier flange)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-2 (R-07)	3.1.1-68	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
154	Reactor coolant pump (thermal barrier flange)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-2 (R-07)	3.1.1-68	B
155	Reactor coolant pump (thermal barrier flange)	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
156	Reactor coolant pump (thermal barrier flange)	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
157	Reactor coolant pump (thermal barrier flange)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A
158	Reactor coolant pump (thermal barrier flange)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
159	Reactor coolant pump (thermal barrier HX)	Pressure boundary and Heat transfer	Stainless steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	V.D1-4 (E-19)	3.2.1-28	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
160	Reactor coolant pump (thermal barrier HX)	Pressure boundary and Heat transfer	Stainless steel	Closed cycle cooling water	Reduction of heat transfer	Closed-Cycle Cooling Water System (B.2.9)	V.D1-9 (EP-35)	3.2.1-30	A
161	Reactor coolant pump (thermal barrier HX)	Pressure boundary and Heat transfer	Stainless steel	Reactor coolant-EXT	Cracking	One-Time Inspection (B.2.30)	IV.C2-17 (R-24)	3.1.1-36	C
162	Reactor coolant pump (thermal barrier HX)	Pressure boundary and Heat transfer	Stainless steel	Reactor coolant-EXT	Cracking	Water Chemistry (B.2.42)	IV.C2-17 (R-24)	3.1.1-36	C
163	Reactor coolant pump (thermal barrier HX)	Pressure boundary and Heat transfer	Stainless steel	Reactor coolant-EXT	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	C
164	Reactor coolant pump (thermal barrier HX)	Pressure boundary and Heat transfer	Stainless steel	Reactor coolant-EXT	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	C
165	Reactor coolant pump (thermal barrier HX)	Pressure boundary and Heat transfer	Stainless steel	Reactor coolant-EXT	Reduction of heat transfer	One-Time Inspection (B.2.30)	N/A	N/A	H

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
166	Reactor coolant pump (thermal barrier HX)	Pressure boundary and Heat transfer	Stainless steel	Reactor coolant-EXT	Reduction of heat transfer	Water Chemistry (B.2.42)	N/A	N/A	H
167	Steam generator (divider plate)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.D1-6 (RP-21)	3.1.1-81	A
168	Steam generator (divider plate)	Pressure boundary	Nickel alloy	Reactor coolant	Cumulative fatigue damage	TLAA	IV.D1-8 (R-221)	3.1.1-10	C
169	Steam generator (divider plate)	Pressure boundary	Nickel alloy	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	C
170	Steam generator (drain tube - Unit 2 only)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.D1-4 (R-01)	3.1.1-31	D
171	Steam generator (drain tube - Unit 2 only)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Nickel-Alloy Nozzles and Penetrations (B.2.28)	IV.D1-4 (R-01)	3.1.1-31	C
172	Steam generator (drain tube - Unit 2 only)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.D1-4 (R-01)	3.1.1-31	C

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
173	Steam generator (drain tube - Unit 2 only)	Pressure boundary	Nickel alloy	Reactor coolant	Cumulative fatigue damage	TLAA	IV.D1-8 (R-221)	3.1.1-10	C
174	Steam generator (drain tube - Unit 2 only)	Pressure boundary	Nickel alloy	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
175	Steam generator (drain tube - Unit 2 only)	Pressure boundary	Nickel alloy	Air - indoor uncontrolled-EXT	None	None	IV.E-1 (RP-03)	3.1.1-85	A
176	Steam generator (drain tube - Unit 2 only)	Pressure boundary	Nickel alloy	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A, 102
177	Steam generator (feed ring)	Direct flow	Steel	Secondary feedwater/ steam	Cumulative fatigue damage	TLAA	IV.D1-11 (R-33)	3.1.1-07	C
178	Steam generator (feed ring)	Direct flow	Steel	Secondary feedwater/ steam	Loss of material	One-Time Inspection (B.2.30)	IV.D1-26 (R-51)	3.1.1-32	E
179	Steam generator (feed ring)	Direct flow	Steel	Secondary feedwater/ steam	Loss of material	Steam Generator Tube Integrity (B.2.38)	IV.D1-9 (RP-16)	3.1.1-76	C

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
180	Steam generator (feed ring)	Direct flow	Steel	Secondary feedwater/ steam	Loss of material	Water Chemistry (B.2.42)	IV.D1-9 (RP-16)	3.1.1-76	C
181	Steam generator (flow limiter)	Flow restriction	Nickel alloy	Secondary feedwater/ steam	Cracking	Steam Generator Tube Integrity (B.2.38)	IV.D1-14 (RP-14)	3.1.1-74	C
182	Steam generator (flow limiter)	Flow restriction	Nickel alloy	Secondary feedwater/ steam	Cracking	Water Chemistry (B.2.42)	IV.D1-14 (RP-14)	3.1.1-74	C
183	Steam generator (flow limiter)	Flow restriction	Nickel alloy	Secondary feedwater/ steam	Cumulative fatigue damage	TLAA	IV.D1-21 (R-46)	3.1.1-06	C
184	Steam generator (flow limiter)	Flow restriction	Nickel alloy	Secondary feedwater/ steam	Loss of material	Water Chemistry (B.2.42)	N/A	N/A	H
185	Steam generator (manway insert, closure ring)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.D1-1 (R-07)	3.1.1-68	B
186	Steam generator (manway insert, closure ring)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.D1-1 (R-07)	3.1.1-68	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
187	Steam generator (manway insert, closure ring)	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.D1-8 (R-221)	3.1.1-10	A
188	Steam generator (manway insert, closure ring)	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	C
189	Steam generator (primary chamber, nozzle, manway)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.D1-1 (R-07)	3.1.1-68	D
190	Steam generator (primary chamber, nozzle, manway)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.D1-1 (R-07)	3.1.1-68	C
191	Steam generator (primary chamber, nozzle, manway)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Cumulative fatigue damage	TLAA	IV.D1-8 (R-221)	3.1.1-10	A
192	Steam generator (primary chamber, nozzle, manway)	Pressure boundary	Steel with stainless steel cladding	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	C

Table 3.1.2-3 (continued): Reactor Coolant System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
193	Steam generator (primary chamber, nozzle, manway)	Pressure boundary	Steel with stainless steel cladding	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.D1-3 (R-17)	3.1.1-58	A
194	Steam generator (primary nozzle safe end)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.D1-1 (R-07)	3.1.1-68	B
195	Steam generator (primary nozzle safe end)	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.D1-1 (R-07)	3.1.1-68	A
196	Steam generator (primary nozzle safe end)	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.D1-8 (R-221)	3.1.1-10	A
197	Steam generator (primary nozzle safe end)	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	C
198	Steam generator (primary nozzle safe end)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A
199	Steam generator (primary nozzle safe end)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
200	Steam generator (primary safe end weld)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Nickel-Alloy Nozzles and Penetrations (B.2.28)	IV.D1-4 (R-01)	3.1.1-31	A
201	Steam generator (primary safe end weld)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.D1-4 (R-01)	3.1.1-31	A
202	Steam generator (primary safe end weld)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.D1-4 (R-01)	3.1.1-31	B
203	Steam generator (primary safe end weld)	Pressure boundary	Nickel alloy	Reactor coolant	Cumulative fatigue damage	TLAA	IV.D1-8 (R-221)	3.1.1-10	A
204	Steam generator (primary safe end weld)	Pressure boundary	Nickel alloy	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
205	Steam generator (primary safe end weld)	Pressure boundary	Nickel alloy	Air - indoor uncontrolled-EXT	None	None	IV.E-1 (RP-03)	3.1.1-85	A
206	Steam generator (primary safe end weld)	Pressure boundary	Nickel alloy	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A, 102

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
207	Steam generator (secondary manway/ handhole cover)	Pressure boundary	Steel	Secondary feedwater/ steam	Cumulative fatigue damage	TLAA	IV.D1-11 (R-33)	3.1.1-07	C
208	Steam generator (secondary manway/ handhole cover)	Pressure boundary	Steel	Secondary feedwater/ steam	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.D1-12 (R-34)	3.1.1-16	D
209	Steam generator (secondary manway/ handhole cover)	Pressure boundary	Steel	Secondary feedwater/ steam	Loss of material	Water Chemistry (B.2.42)	IV.D1-12 (R-34)	3.1.1-16	C
210	Steam generator (secondary manway/ handhole cover)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.D1-3 (R-17)	3.1.1-58	A
211	Steam generator (secondary mnwy, handhole insert)	Pressure boundary	Nickel alloy	Secondary feedwater/ steam	Cracking	Water Chemistry (B.2.42)	IV.D1-14 (RP-14)	3.1.1-74	C

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
212	Steam generator (secondary mnwy, handhole insert)	Pressure boundary	Nickel alloy	Secondary feedwater/ steam	Cracking	Steam Generator Tube Integrity (B.2.38)	IV.D1-14 (RP-14)	3.1.1-74	C
213	Steam generator (secondary mnwy, handhole insert)	Pressure boundary	Nickel alloy	Secondary feedwater/ steam	Cumulative fatigue damage	TLAA	IV.D1-21 (R-46)	3.1.1-06	C
214	Steam generator (secondary mnwy, handhole insert)	Pressure boundary	Nickel alloy	Secondary feedwater/ steam	Loss of material	Water Chemistry (B.2.42)	N/A	N/A	H
215	Steam generator (secondary nozzles, top head)	Pressure boundary	Steel	Secondary feedwater/ steam	Cumulative fatigue damage	TLAA	IV.D1-11 (R-33)	3.1.1-07	A
216	Steam generator (secondary nozzles, top head)	Pressure boundary	Steel	Secondary feedwater/ steam	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.D1-12 (R-34)	3.1.1-16	D

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
217	Steam generator (secondary nozzles, top head)	Pressure boundary	Steel	Secondary feedwater/ steam	Loss of material	Water Chemistry (B.2.42)	IV.D1-12 (R-34)	3.1.1-16	C
218	Steam generator (secondary nozzles, top head)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.D1-3 (R-17)	3.1.1-58	A
219	Steam generator (shells, transition cone)	Pressure boundary	Steel	Secondary feedwater/ steam	Cumulative fatigue damage	TLAA	IV.D1-11 (R-33)	3.1.1-07	A
220	Steam generator (shells, transition cone)	Pressure boundary	Steel	Secondary feedwater/ steam	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.D1-12 (R-34)	3.1.1-16	B
221	Steam generator (shells, transition cone)	Pressure boundary	Steel	Secondary feedwater/ steam	Loss of material	Water Chemistry (B.2.42)	IV.D1-12 (R-34)	3.1.1-16	A
222	Steam generator (shells, transition cone)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.D1-3 (R-17)	3.1.1-58	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
223	Steam generator (stayrod)	Structural/ Functional support	Steel	Secondary feedwater/ steam	Cumulative fatigue damage	TLAA	IV.D1-11 (R-33)	3.1.1-07	C
224	Steam generator (stayrod)	Structural/ Functional support	Steel	Secondary feedwater/ steam	Loss of material	Water Chemistry (B.2.42)	IV.D1-9 (RP-16)	3.1.1-76	C
225	Steam generator (stayrod)	Structural/ Functional support	Steel	Secondary feedwater/ steam	Loss of material	Steam Generator Tube Integrity (B.2.38)	IV.D1-9 (RP-16)	3.1.1-76	C
226	Steam generator (tube bundle wrapper)	Structural/ Functional support	Steel	Secondary feedwater/ steam	Cumulative fatigue damage	TLAA	IV.D1-11 (R-33)	3.1.1-07	C
227	Steam generator (tube bundle wrapper)	Structural/ Functional support	Steel	Secondary feedwater/ steam	Loss of material	Steam Generator Tube Integrity (B.2.38)	IV.D1-9 (RP-16)	3.1.1-76	C
228	Steam generator (tube bundle wrapper)	Structural/ Functional support	Steel	Secondary feedwater/ steam	Loss of material	Water Chemistry (B.2.42)	IV.D1-9 (RP-16)	3.1.1-76	C
229	Steam generator (tube plug)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Steam Generator Tube Integrity (B.2.38)	IV.D1-18 (R-40)	3.1.1-73	A
230	Steam generator (tube plug)	Pressure boundary	Nickel alloy	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.D1-18 (R-40)	3.1.1-73	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
231	Steam generator (tube plug)	Pressure boundary	Nickel alloy	Reactor coolant	Cumulative fatigue damage	TLAA	IV.D1-21 (R-46)	3.1.1-06	C
232	Steam generator (tube plug)	Pressure boundary	Nickel alloy	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	C
233	Steam generator (tubesheet)	Pressure boundary	Steel with nickel alloy cladding	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.D1-4 (R-01)	3.1.1-31	C
234	Steam generator (tubesheet)	Pressure boundary	Steel with nickel alloy cladding	Reactor coolant	Cracking	Nickel-Alloy Nozzles and Penetrations (B.2.28)	IV.D1-4 (R-01)	3.1.1-31	C
235	Steam generator (tubesheet)	Pressure boundary	Steel with nickel alloy cladding	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.D1-4 (R-01)	3.1.1-31	D
236	Steam generator (tubesheet)	Pressure boundary	Steel with nickel alloy cladding	Reactor coolant	Cumulative fatigue damage	TLAA	IV.D1-8 (R-221)	3.1.1-10	C
237	Steam generator (tubesheet)	Pressure boundary	Steel with nickel alloy cladding	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	C

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
238	Steam generator (tubesheet)	Pressure boundary	Steel with nickel alloy cladding	Secondary feedwater/ steam-EXT	Cumulative fatigue damage	TLAA	IV.D1-11 (R-33)	3.1.1-07	C
239	Steam generator (tubesheet)	Pressure boundary	Steel with nickel alloy cladding	Secondary feedwater/ steam-EXT	Loss of material	Steam Generator Tube Integrity (B.2.38)	IV.D1-9 (RP-16)	3.1.1-76	C
240	Steam generator (tubesheet)	Pressure boundary	Steel with nickel alloy cladding	Secondary feedwater/ steam-EXT	Loss of material	Water Chemistry (B.2.42)	IV.D1-9 (RP-16)	3.1.1-76	C
241	Steam generator (Unit 1 anti-vibration bar)	Structural/ Functional support	Stainless steel	Secondary feedwater/ steam	Cracking	Steam Generator Tube Integrity (B.2.38)	IV.D1-14 (RP-14)	3.1.1-74	A
242	Steam generator (Unit 1 anti-vibration bar)	Structural/ Functional support	Stainless steel	Secondary feedwater/ steam	Cracking	Water Chemistry (B.2.42)	IV.D1-14 (RP-14)	3.1.1-74	A
243	Steam generator (Unit 1 anti-vibration bar)	Structural/ Functional support	Stainless steel	Secondary feedwater/ steam	Cumulative fatigue damage	TLAA	N/A	N/A	H
244	Steam generator (Unit 1 anti-vibration bar)	Structural/ Functional support	Stainless steel	Secondary feedwater/ steam	Loss of material	Water Chemistry (B.2.42)	IV.D1-15 (RP-15)	3.1.1-74	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
245	Steam generator (Unit 1 anti-vibration bar)	Structural/ Functional support	Stainless steel	Secondary feedwater/ steam	Loss of material	Steam Generator Tube Integrity (B.2.38)	IV.D1-15 (RP-15)	3.1.1-74	A
246	Steam generator (Unit 1 feed ring spray nozzle)	Pressure boundary	Nickel alloy	Secondary feedwater/ steam	Cracking	Steam Generator Tube Integrity (B.2.38)	IV.D1-14 (RP-14)	3.1.1-74	C
247	Steam generator (Unit 1 feed ring spray nozzle)	Pressure boundary	Nickel alloy	Secondary feedwater/ steam	Cracking	Water Chemistry (B.2.42)	IV.D1-14 (RP-14)	3.1.1-74	C
248	Steam generator (Unit 1 feed ring spray nozzle)	Pressure boundary	Nickel alloy	Secondary feedwater/ steam	Cumulative fatigue damage	TLAA	IV.D1-21 (R-46)	3.1.1-06	C
249	Steam generator (Unit 1 feed ring spray nozzle)	Pressure boundary	Nickel alloy	Secondary feedwater/ steam	Loss of material	Steam Generator Tube Integrity (B.2.38)	IV.D1-15 (RP-15)	3.1.1-74	C
250	Steam generator (Unit 1 feed ring spray nozzle)	Pressure boundary	Nickel alloy	Secondary feedwater/ steam	Loss of material	Water Chemistry (B.2.42)	IV.D1-15 (RP-15)	3.1.1-74	C
251	Steam generator (Unit 1 feedwater thermal sleeve)	Pressure boundary	Nickel alloy	Secondary feedwater/ steam	Cracking	Steam Generator Tube Integrity (B.2.38)	IV.D1-14 (RP-14)	3.1.1-74	C

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
252	Steam generator (Unit 1 feedwater thermal sleeve)	Pressure boundary	Nickel alloy	Secondary feedwater/ steam	Cracking	Water Chemistry (B.2.42)	IV.D1-14 (RP-14)	3.1.1-74	C
253	Steam generator (Unit 1 feedwater thermal sleeve)	Pressure boundary	Nickel alloy	Secondary feedwater/ steam	Cumulative fatigue damage	TLAA	IV.D1-21 (R-46)	3.1.1-06	C
254	Steam generator (Unit 1 feedwater thermal sleeve)	Pressure boundary	Nickel alloy	Secondary feedwater/ steam	Loss of material	Steam Generator Tube Integrity (B.2.38)	IV.D1-15 (RP-15)	3.1.1-74	C
255	Steam generator (Unit 1 feedwater thermal sleeve)	Pressure boundary	Nickel alloy	Secondary feedwater/ steam	Loss of material	Water Chemistry (B.2.42)	IV.D1-15 (RP-15)	3.1.1-74	C
256	Steam generator (Unit 1 tube support plate)	Structural/ Functional support	Stainless steel	Secondary feedwater/ steam	Cracking	Water Chemistry (B.2.42)	IV.D1-14 (RP-14)	3.1.1-74	C
257	Steam generator (Unit 1 tube support plate)	Structural/ Functional support	Stainless steel	Secondary feedwater/ steam	Cracking	Steam Generator Tube Integrity (B.2.38)	IV.D1-14 (RP-14)	3.1.1-74	C
258	Steam generator (Unit 1 tube support plate)	Structural/ Functional support	Stainless steel	Secondary feedwater/ steam	Cumulative fatigue damage	TLAA	N/A	N/A	H

Table 3.1.2-3 (continued): Reactor Coolant System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
259	Steam generator (Unit 1 tube support plate)	Structural/ Functional support	Stainless steel	Secondary feedwater/ steam	Loss of material	Steam Generator Tube Integrity (B.2.38)	IV.D1-15 (RP-15)	3.1.1-74	C
260	Steam generator (Unit 1 tube support plate)	Structural/ Functional support	Stainless steel	Secondary feedwater/ steam	Loss of material	Water Chemistry (B.2.42)	IV.D1-15 (RP-15)	3.1.1-74	C
261	Steam generator (Unit 1 tube)	Pressure boundary and Heat transfer	Nickel alloy	Reactor coolant	Cracking	Steam Generator Tube Integrity (B.2.38)	IV.D1-20 (R-44)	3.1.1-73	A
262	Steam generator (Unit 1 tube)	Pressure boundary and Heat transfer	Nickel alloy	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.D1-20 (R-44)	3.1.1-73	A
263	Steam generator (Unit 1 tube)	Pressure boundary and Heat transfer	Nickel alloy	Reactor coolant	Cumulative fatigue damage	TLAA	IV.D1-21 (R-46)	3.1.1-06	A
264	Steam generator (Unit 1 tube)	Pressure boundary and Heat transfer	Nickel alloy	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
265	Steam generator (Unit 1 tube)	Pressure boundary and Heat transfer	Nickel alloy	Reactor coolant	Reduction of heat transfer	Steam Generator Tube Integrity (B.2.38)	N/A	N/A	H
266	Steam generator (Unit 1 tube)	Pressure boundary and Heat transfer	Nickel alloy	Reactor coolant	Reduction of heat transfer	Water Chemistry (B.2.42)	N/A	N/A	H
267	Steam generator (Unit 1 tube)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Cracking	Steam Generator Tube Integrity (B.2.38)	IV.D1-23 (R-47)	3.1.1-72	A
268	Steam generator (Unit 1 tube)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Cracking	Water Chemistry (B.2.42)	IV.D1-23 (R-47)	3.1.1-72	A
269	Steam generator (Unit 1 tube)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Loss of material	Steam Generator Tube Integrity (B.2.38)	IV.D1-24 (R-49)	3.1.1-72	A
270	Steam generator (Unit 1 tube)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Loss of material	Water Chemistry (B.2.42)	IV.D1-24 (R-49)	3.1.1-72	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
271	Steam generator (Unit 1 tube)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Reduction of heat transfer	Water Chemistry (B.2.42)	N/A	N/A	H
272	Steam generator (Unit 1 tube)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Reduction of heat transfer	Steam Generator Tube Integrity (B.2.38)	N/A	N/A	H
273	Steam generator (Unit 2 anti-vibration bar)	Structural/ Functional support	Nickel alloy	Secondary feedwater/ steam	Cracking	Steam Generator Tube Integrity (B.2.38)	IV.D1-14 (RP-14)	3.1.1-74	A
274	Steam generator (Unit 2 anti-vibration bar)	Structural/ Functional support	Nickel alloy	Secondary feedwater/ steam	Cracking	Water Chemistry (B.2.42)	IV.D1-14 (RP-14)	3.1.1-74	A
275	Steam generator (Unit 2 anti-vibration bar)	Structural/ Functional support	Nickel alloy	Secondary feedwater/ steam	Cumulative fatigue damage	TLAA	IV.D1-21 (R-46)	3.1.1-06	C
276	Steam generator (Unit 2 anti-vibration bar)	Structural/ Functional support	Nickel alloy	Secondary feedwater/ steam	Loss of material	Steam Generator Tube Integrity (B.2.38)	IV.D1-15 (RP-15)	3.1.1-74	A
277	Steam generator (Unit 2 anti-vibration bar)	Structural/ Functional support	Nickel alloy	Secondary feedwater/ steam	Loss of material	Water Chemistry (B.2.42)	IV.D1-15 (RP-15)	3.1.1-74	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
278	Steam generator (Unit 2 feedwater thermal sleeve)	Pressure boundary	Steel	Secondary feedwater/ steam	Cumulative fatigue damage	TLAA	IV.D1-11 (R-33)	3.1.1-07	C
279	Steam generator (Unit 2 feedwater thermal sleeve)	Pressure boundary	Steel	Secondary feedwater/ steam	Loss of material	Steam Generator Tube Integrity (B.2.38)	IV.D1-9 (RP-16)	3.1.1-76	C
280	Steam generator (Unit 2 feedwater thermal sleeve)	Pressure boundary	Steel	Secondary feedwater/ steam	Loss of material	Water Chemistry (B.2.42)	IV.D1-9 (RP-16)	3.1.1-76	C
281	Steam generator (Unit 2 J-tubes)	Direct flow	Nickel alloy	Secondary feedwater/ steam	Cracking	Steam Generator Tube Integrity (B.2.38)	IV.D1-14 (RP-14)	3.1.1-74	C
282	Steam generator (Unit 2 J-tubes)	Direct flow	Nickel alloy	Secondary feedwater/ steam	Cracking	Water Chemistry (B.2.42)	IV.D1-14 (RP-14)	3.1.1-74	C
283	Steam generator (Unit 2 J-tubes)	Direct flow	Nickel alloy	Secondary feedwater/ steam	Cumulative fatigue damage	TLAA	IV.D1-21 (R-46)	3.1.1-06	C
284	Steam generator (Unit 2 J-tubes)	Direct flow	Nickel alloy	Secondary feedwater/ steam	Loss of material	Steam Generator Tube Integrity (B.2.38)	IV.D1-15 (RP-15)	3.1.1-74	C

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
285	Steam generator (Unit 2 J-tubes)	Direct flow	Nickel alloy	Secondary feedwater/ steam	Loss of material	Water Chemistry (B.2.42)	IV.D1-15 (RP-15)	3.1.1-74	C
286	Steam generator (Unit 2 tube sleeve)	Pressure boundary and Heat transfer	Nickel alloy	Reactor coolant	Cracking	Steam Generator Tube Integrity (B.2.38)	IV.D1-20 (R-44)	3.1.1-73	A
287	Steam generator (Unit 2 tube sleeve)	Pressure boundary and Heat transfer	Nickel alloy	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.D1-20 (R-44)	3.1.1-73	A
288	Steam generator (Unit 2 tube sleeve)	Pressure boundary and Heat transfer	Nickel alloy	Reactor coolant	Cumulative fatigue damage	TLAA	IV.D1-21 (R-46)	3.1.1-06	A
289	Steam generator (Unit 2 tube sleeve)	Pressure boundary and Heat transfer	Nickel alloy	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
290	Steam generator (Unit 2 tube sleeve)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Cracking	Steam Generator Tube Integrity (B.2.38)	IV.D1-23 (R-47)	3.1.1-72	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
291	Steam generator (Unit 2 tube sleeve)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Cracking	Water Chemistry (B.2.42)	IV.D1-23 (R-47)	3.1.1-72	A
292	Steam generator (Unit 2 tube sleeve)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Loss of material	Steam Generator Tube Integrity (B.2.38)	IV.D1-24 (R-49)	3.1.1-72	A
293	Steam generator (Unit 2 tube sleeve)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Loss of material	Water Chemistry (B.2.42)	IV.D1-24 (R-49)	3.1.1-72	A
294	Steam generator (Unit 2 tube support plate)	Structural/ Functional support	Steel	Secondary feedwater/ steam	Cracking	Water Chemistry (B.2.42)	IV.D1-17 (R-42)	3.1.1-76	A
295	Steam generator (Unit 2 tube support plate)	Structural/ Functional support	Steel	Secondary feedwater/ steam	Cracking	Steam Generator Tube Integrity (B.2.38)	IV.D1-17 (R-42)	3.1.1-76	A
296	Steam generator (Unit 2 tube support plate)	Structural/ Functional support	Steel	Secondary feedwater/ steam	Cumulative fatigue damage	TLAA	IV.D1-11 (R-33)	3.1.1-07	C
297	Steam generator (Unit 2 tube support plate)	Structural/ Functional support	Steel	Secondary feedwater/ steam	Loss of material	Steam Generator Tube Integrity (B.2.38)	IV.D1-9 (RP-16)	3.1.1-76	C

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
298	Steam generator (Unit 2 tube support plate)	Structural/ Functional support	Steel	Secondary feedwater/ steam	Loss of material	Water Chemistry (B.2.42)	IV.D1-9 (RP-16)	3.1.1-76	C
299	Steam generator (Unit 2 tube)	Pressure boundary and Heat transfer	Nickel alloy	Reactor coolant	Cracking	Steam Generator Tube Integrity (B.2.38)	IV.D1-20 (R-44)	3.1.1-73	A
300	Steam generator (Unit 2 tube)	Pressure boundary and Heat transfer	Nickel alloy	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.D1-20 (R-44)	3.1.1-73	A
301	Steam generator (Unit 2 tube)	Pressure boundary and Heat transfer	Nickel alloy	Reactor coolant	Cumulative fatigue damage	TLAA	IV.D1-21 (R-46)	3.1.1-06	A
302	Steam generator (Unit 2 tube)	Pressure boundary and Heat transfer	Nickel alloy	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
303	Steam generator (Unit 2 tube)	Pressure boundary and Heat transfer	Nickel alloy	Reactor coolant	Reduction of heat transfer	Water Chemistry (B.2.42)	N/A	N/A	H

Table 3.1.2-3 (continued): Reactor Coolant System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
304	Steam generator (Unit 2 tube)	Pressure boundary and Heat transfer	Nickel alloy	Reactor coolant	Reduction of heat transfer	Steam Generator Tube Integrity (B.2.38)	N/A	N/A	H
305	Steam generator (Unit 2 tube)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Cracking	Water Chemistry (B.2.42)	IV.D1-23 (R-47)	3.1.1-72	A
306	Steam generator (Unit 2 tube)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Cracking	Steam Generator Tube Integrity (B.2.38)	IV.D1-23 (R-47)	3.1.1-72	A
307	Steam generator (Unit 2 tube)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Denting	Steam Generator Tube Integrity (B.2.38)	IV.D1-19 (R-43)	3.1.1-79	A
308	Steam generator (Unit 2 tube)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Denting	Water Chemistry (B.2.42)	IV.D1-19 (R-43)	3.1.1-79	A
309	Steam generator (Unit 2 tube)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Loss of material	Steam Generator Tube Integrity (B.2.38)	IV.D1-24 (R-49)	3.1.1-72	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
310	Steam generator (Unit 2 tube)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Loss of material	Water Chemistry (B.2.42)	IV.D1-24 (R-49)	3.1.1-72	A
311	Steam generator (Unit 2 tube)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Reduction of heat transfer	Steam Generator Tube Integrity (B.2.38)	N/A	N/A	H
312	Steam generator (Unit 2 tube)	Pressure boundary and Heat transfer	Nickel alloy	Secondary feedwater/ steam-EXT	Reduction of heat transfer	Water Chemistry (B.2.42)	N/A	N/A	H
313	Thermal sleeve	Pressure boundary	Stainless steel	Reactor coolant	Cracking	One-Time Inspection (B.2.30)	IV.C2-17 (R-24)	3.1.1-36	C
314	Thermal sleeve	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-17 (R-24)	3.1.1-36	C
315	Thermal sleeve	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
316	Thermal sleeve	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
317	Tubing	Leakage boundary (spatial)	Stainless steel	Gas	None	None	IV.E-5 (RP-07)	3.1.1-86	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
318	Tubing	Leakage boundary (spatial)	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-2 (R-07)	3.1.1-68	A
319	Tubing	Leakage boundary (spatial)	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-2 (R-07)	3.1.1-68	B
320	Tubing	Leakage boundary (spatial)	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
321	Tubing	Leakage boundary (spatial)	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
322	Tubing	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A
323	Tubing	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	N/A	N/A	G
324	Tubing	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	N/A	N/A	G

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
325	Tubing	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A
326	Tubing	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
327	Tubing	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-2 (R-07)	3.1.1-68	A
328	Tubing	Pressure boundary	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-2 (R-07)	3.1.1-68	B
329	Tubing	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
330	Tubing	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
331	Tubing	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A
332	Tubing	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
333	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Cast austenitic stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	N/A	N/A	G
334	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Cast austenitic stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	N/A	N/A	G
335	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
336	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
337	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Gas	None	None	IV.E-5 (RP-07)	3.1.1-86	A
338	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-5 (R-09)	3.1.1-68	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
339	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-5 (R-09)	3.1.1-68	B
340	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
341	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
342	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A
343	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	N/A	N/A	G
344	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	N/A	N/A	G

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
345	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A
346	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
347	Valve body	Pressure boundary	Cast austenitic stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-5 (R-09)	3.1.1-68	B
348	Valve body	Pressure boundary	Cast austenitic stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-5 (R-09)	3.1.1-68	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
349	Valve body	Pressure boundary	Cast austenitic stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
350	Valve body	Pressure boundary	Cast austenitic stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
351	Valve body	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-5 (R-09)	3.1.1-68	B
352	Valve body	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Cracking	Water Chemistry (B.2.42)	IV.C2-5 (R-09)	3.1.1-68	A
353	Valve body	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A

Table 3.1.2-3 (continued): Reactor Coolant System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
354	Valve body	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Loss of fracture toughness	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-6 (R-08)	3.1.1-55	B
355	Valve body	Pressure boundary	Cast austenitic stainless steel	Reactor coolant >250°C (>482°F)	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
356	Valve body	Pressure boundary	Cast austenitic stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	N/A	N/A	G
357	Valve body	Pressure boundary	Cast austenitic stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	N/A	N/A	G
358	Valve body	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
359	Valve body	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
360	Valve body	Pressure boundary	Stainless steel	Reactor coolant	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.2.2)	IV.C2-5 (R-09)	3.1.1-68	B
361	Valve body	Pressure boundary	Stainless steel	Reactor coolant	Cracking	Water Chemistry (B.2.42)	IV.C2-5 (R-09)	3.1.1-68	A
362	Valve body	Pressure boundary	Stainless steel	Reactor coolant	Cumulative fatigue damage	TLAA	IV.C2-25 (R-223)	3.1.1-08	A
363	Valve body	Pressure boundary	Stainless steel	Reactor coolant	Loss of material	Water Chemistry (B.2.42)	IV.C2-15 (RP-23)	3.1.1-83	A
364	Valve body	Pressure boundary	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	N/A	N/A	G
365	Valve body	Pressure boundary	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	N/A	N/A	G
366	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
367	Valve body	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	IV.E-3 (RP-05)	3.1.1-86	A
368	Valve body (N_2 supply)	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Gas	None	None	VII.J-23 (AP-6)	3.3.1-97	A
369	Valve body (N_2 supply)	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
370	Valve body (N_2 supply)	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.C2-9 (R-17)	3.1.1-58	A

Table 3.1.2-3 (continued): Reactor Coolant System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
371	Valve body (N_2 supply)	Pressure boundary	Steel	Gas	None	None	VII.J-23 (AP-6)	3.3.1-97	A
372	Valve body (N_2 supply)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
373	Valve body (N_2 supply)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	IV.C2-9 (R-17)	3.1.1-58	A
374	Valve body (Unit 2 N_2 supply)	Pressure boundary	Cast austenitic stainless steel	Gas	None	None	VII.J-23 (AP-6)	3.3.1-97	A
375	Valve body (Unit 2 N_2 supply)	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	IV.E-2 (RP-04)	3.1.1-86	A

Notes for Tables 3.1.2-1 through 3.1.2-3

Generic notes

A. Consistent with NUREG-1801 item for component, material, environment and aging effect. AMP is consistent with NUREG-1801 AMP.

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

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

D. Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP has some exceptions to NUREG-1801 AMP.

E. Consistent with NUREG-1801 item for material, environment and aging effect, but a different aging management program is credited or NUREG-1801 identifies a plant-specific aging management program.

F. Material not in NUREG-1801 (Chapter IV) for this component.

G. Environment not in NUREG-1801 (Chapter IV) for this component and material.

H. Aging effect not in NUREG-1801 (Chapter IV) for this component, material and environment combination.

I. Aging effect in NUREG-1801 (Chapter IV) 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 (Chapter IV).

Plant-specific notes

101. Internal surfaces of the steel pressurizer relief tank in contact with treated water are coated with Amercoat 55, but this coating is not credited in aging evaluations.

102. For the purpose of NUREG-1801 comparison, the aging effect is also applicable to nickel alloy in this environment.

103. For the purpose of NUREG-1801 comparison, the listed environment was determined to be equivalent to the cited NUREG-1801 row environment.

104. The plant-specific Reactor Vessel Integrity Program (Section B.2.35) includes flux reduction strategies for Unit 1, and is used at both units instead of the NUREG-1801 XI.M31 Reactor Vessel Surveillance Program.

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3.2 AGING MANAGEMENT OF ENGINEERED SAFETY FEATURES

3.2.1 INTRODUCTION

This chapter 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 listed systems are addressed in this chapter. A link to the associated system description section in Chapter 2 is also provided.

- Containment Depressurization System (Section 3.2.2.1.1) / (Section 2.3.2.1)
- Residual Heat Removal System (Section 3.2.2.1.2) / (Section 2.3.2.2)
- Safety Injection System (Section 3.2.2.1.3) / (Section 2.3.2.3)

Table 3.2.1, *Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features*, provides the summary of the programs evaluated in NUREG-1801 [Reference 1.3-5] 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 Engineered Safety Features system group.

- Table 3.2.2-1 Containment Depressurization System – Summary of Aging Management Evaluation
- Table 3.2.2-2 Residual Heat Removal System – Summary of Aging Management Evaluation
- Table 3.2.2-3 Safety Injection System – Summary of Aging Management Evaluation

3.2.2.1 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 Engineered Safety Features Systems. Programs are described in Appendix B. Further details are provided in the system tables.

3.2.2.1.1 Containment Depressurization System

Materials

Containment Depressurization System components are constructed of the following materials.

- Cast austenitic stainless steel
- Copper alloy >15% Zn
- Nickel alloy
- Stainless steel
- Steel

Environment

Containment Depressurization System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air-outdoor
- Air with borated water leakage
- Closed cycle cooling water
- Concrete
- Condensation
- Gas
- Raw water
- Soil
- Treated borated water
- Treated water

Aging Effects Requiring Management

The following aging effects associated with the Containment Depressurization System require management.

- Loss of material
- Reduction of heat transfer

Aging Management Programs

The following aging management programs manage the effects of aging on the Containment Depressurization System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- One-Time Inspection (Section B.2.30)
- Open-Cycle Cooling Water System (Section B.2.32)
- Water Chemistry (Section B.2.42)

3.2.2.1.2 Residual Heat Removal System

Materials

Residual Heat Removal System components are constructed of the following materials.

- Cast austenitic stainless steel
- Nickel alloy
- Stainless steel
- Steel

Environment

Residual Heat Removal System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air with borated water leakage
- Closed cycle cooling water
- Gas
- Treated borated water >60°C (>140°F)

Aging Effects Requiring Management

The following aging effects associated with the Residual Heat Removal System require management.

- Cracking
- Cumulative fatigue damage
- Loss of material
- Reduction of heat transfer

Aging Management Programs

The following aging management programs manage the effects of aging on the Residual Heat Removal System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Water Chemistry (Section B.2.42)

3.2.2.1.3 Safety Injection System

Materials

Safety Injection System components are constructed of the following materials.

- Cast austenitic stainless steel
- Copper alloy >15% Zn

- Nickel alloy
- Stainless steel
- Steel
- Steel with stainless steel cladding

Environment

Safety Injection System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air-outdoor
- Air with borated water leakage
- Concrete
- Condensation
- Dried air
- Gas
- Treated borated water
- Treated borated water >60°C (>140°F)

Aging Effects Requiring Management

The following aging effects associated with the Safety Injection System require management.

- Cracking
- Loss of material
- Reduction of heat transfer

Aging Management Programs

The following aging management programs manage the effects of aging on the Safety Injection System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- One-Time Inspection (Section B.2.30)
- Water Chemistry (Section B.2.42)

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. Section 3.2.2.2 of NUREG-1800 [Reference 1.3-4] discusses these aging effects and other issues that require further evaluation. The following sections are numbered in accordance with the discussions in NUREG-1800 and explain the BVPS approach to these areas requiring further evaluation. Programs are described in Appendix B.

3.2.2.2.1 Cumulative Fatigue Damage

Fatigue is a TLAA as defined in 10 CFR 54.3 [Reference 1.3-3]. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). The evaluation of this TLAA is addressed separately in Section 4.3 of the LRA.

3.2.2.2.2 Loss of Material Due to Cladding Breach

Loss of material due to cladding breach could occur for PWR steel pump casings with stainless steel cladding exposed to treated borated water. NRC Information Notice 94-63 [Reference 3.0-2] alerted all holders of operating licenses or construction permits to the potential for significant damage that could result from corrosion of reactor system components caused by cracking of the stainless steel cladding. The description of the circumstances surrounding this information notice is as follows:

> *During July and August 1993 the Virginia Electric Power Company discovered severe corrosion damage of the carbon steel casing of a high head safety injection pump at North Anna Unit 1. The damage was caused by cracks through the stainless steel cladding in the pump that allowed corrosive attack by the boric acid coolant. The cracks were discovered when the pump was disassembled for maintenance and rust was observed on the otherwise shiny surface of the cladding in the discharge section of the pump.*

The charging pumps at BVPS are evaluated within the Auxiliary Systems (Section 2.3.3.5). However, they are fabricated from austenitic stainless steel and not from carbon steel with stainless steel cladding. Therefore, loss of material due to cladding breach is not applicable for BVPS.

3.2.2.2.3 Loss of Material Due to Pitting and Crevice Corrosion

3.2.2.2.3.1 Internal Surfaces of Stainless Steel Containment Isolation Components

Loss of material due to pitting and crevice corrosion could occur for internal surfaces of stainless steel containment isolation piping, piping components, and piping elements exposed to treated water. BVPS does not have one single system that addresses Containment isolation components; rather, the internal surfaces of Containment isolation piping and components exposed to treated water at BVPS are evaluated with their parent system. If loss of material due to pitting and crevice corrosion is applicable, an appropriate aging management program is credited.

3.2.2.2.3.2 Buried Stainless Steel Components

Loss of material due to pitting and crevice corrosion is possible for stainless steel piping, piping components, and piping elements exposed to soil.

The bottom surface of the RWST at both units rests on a concrete pad. The bottom surfaces of these outside tanks are protected by construction or treatment methods intended to preclude water from the tank bottoms. However, for a conservative aging evaluation, the stainless steel tank bottoms are assumed to be exposed to water. The environment for the exterior of the tank bottom is evaluated as "Soil" to account for the potentially wetted environment. The One-Time Inspection Program (Section B.2.30) will provide confirmation that loss of material due to microbiologically-influenced corrosion (MIC) and due to crevice and/or pitting corrosion is not occurring.

3.2.2.2.3.3 BWR Stainless Steel and Aluminum Piping

Loss of material from pitting and crevice corrosion could occur for BWR stainless steel and aluminum piping, piping components, and piping elements exposed to treated water. For the purpose of NUREG-1801 comparison, loss of material for BWR stainless steel piping components was determined to be applicable to PWR systems with treated (unborated) water, and was used for comparison because no corresponding NUREG-1801 row existed for PWRs.

BVPS Unit 1 chemical injection pumps and Unit 1 and 2 chemical addition pumps have an internal fluid of NaOH solution. The BVPS position is that this environment is equivalent to the NUREG-1801 "Treated water" environment for aging comparisons. Nickel alloy in this environment was determined to be equivalent to stainless steel for aging comparisons. BVPS manages the aging effects by a combination of the Water Chemistry Program (Section B.2.42) in combination with the One-Time Inspection Program (Section B.2.30).

The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the mitigation of reduction of heat transfer due to fouling. The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation.

3.2.2.2.3.4 Stainless Steel and Copper Alloy Piping Components in Lubricating Oil

Loss of material from pitting and crevice corrosion could occur for stainless steel, and copper alloy piping, piping components, and piping elements exposed to lubricating oil.

BVPS has no components in this category in the ESF systems section. The applicable BVPS components exposed to lubricating oil are associated with the high-head safety injection/charging pumps. The high-head safety injection/ charging pump subcomponents exposed to lubricating oil are evaluated in the Chemical and Volume Control System (CVCS). The CVCS is evaluated in Section 3.3.2.2.10.4 and Section 3.3.2.2.12.2, and rolls up to Table 3.3.1 items 3.3.1-26 and 3.3.1-33.

3.2.2.2.3.5 Bottom Surfaces of Stainless Steel Tanks

Loss of material due to pitting and crevice corrosion could occur for partially encased stainless steel tank bottoms exposed to raw water as a result of leaking perimeter seals from weathering.

BVPS has no components in this category. The RWST is located on a concrete foundation within shield walls, as described in the UFSAR. This is not a partially-encased tank with a moisture barrier as described in NUREG-1801. The tank bottom was evaluated with an external environment of "Soil" to ensure that the potential for pitting and crevice corrosion were addressed. The evaluation for this tank at each unit appears in Section 3.2.2.2.3.2.

3.2.2.2.3.6 Stainless Steel Components Exposed to Internal Condensation

Loss of material from pitting and crevice corrosion could occur for stainless steel piping, piping components, piping elements, and tanks exposed to internal condensation. More specifically, the potential for loss of material on the internal surfaces of piping components may exist due to condensation in Emergency Core Cooling and Containment Spray Systems.

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program (Section B.2.22) will manage these aging effects in the BVPS Unit 1 and Unit 2 Quench Spray chemical addition tanks and RWSTs in the ESF Systems for this material and environment combination.

3.2.2.2.4 Reduction of Heat Transfer Due to Fouling

3.2.2.2.4.1 Fouling of Heat Exchanger Tubes Exposed to Lubricating Oil

Reduction of heat transfer due to fouling could occur for steel, stainless steel, and copper alloy heat exchanger tubes exposed to lubricating oil.

BVPS does not have components with this material, environment, and aging effect in the ESF Systems. The charging / high-head safety injection pumps are evaluated within the Auxiliary Systems section of NUREG-1801, and were not compared to NUREG-1801 rows associated with this Further Evaluation section. However, fouling of the heat exchangers in those pumps is managed by the Lubricating Oil Analysis Program (Section B.2.24) with program effectiveness verified by the One-Time Inspection Program (Section B.2.30).

3.2.2.2.4.2 Fouling of Heat Exchanger Tubes Exposed to Treated Water

Reduction of heat transfer due to fouling could occur for stainless steel heat exchanger tubes exposed to treated water.

BVPS manages reduction of heat transfer due to fouling for the Unit 1 and 2 Containment Depressurization pump seal coolers with the Water Chemistry Program (Section B.2.42) in combination with the One-Time Inspection Program (Section B.2.30). The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the mitigation of reduction of heat transfer due to fouling. The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation.

3.2.2.2.5 Hardening and Loss of Strength Due to Elastomer Degradation in a BWR Standby Gas Treatment System

Hardening and loss of strength due to elastomer degradation could occur in elastomer seals and components associated with the BWR Standby Gas Treatment System ductwork and filters exposed to air-indoor uncontrolled. This item is applicable to BWR plants only.

3.2.2.2.6 Loss of Material Due to Erosion

Loss of material due to erosion could occur in the stainless steel high pressure safety injection (HPSI) pump miniflow recirculation orifices exposed to treated borated water.

The charging / high-head safety injection pump miniflow recirculation orifices at BVPS are evaluated within the Chemical and Volume Control System (Section 2.3.3.5) and are compared to NUREG-1801 rows for Auxiliary Systems. The Water Chemistry Program (Section B.2.42) has been assigned to manage loss of material due to erosion for these components. Surveillance testing of the pumps measures the recirculation flow through the orifices and uses the flow measurement in pump Technical Specification acceptance criteria calculations, so any degradation would be promptly identified by periodic testing.

3.2.2.2.7 Loss of Material Due to General Corrosion and Fouling

Loss of material due to general corrosion and fouling can occur for BWR steel drywell and suppression chamber spray system nozzle and flow orifice internal surfaces exposed to air-indoor uncontrolled. This item is applicable to BWR plants only.

3.2.2.2.8 Loss of Material Due to General, Pitting, and Crevice Corrosion

3.2.2.2.8.1 BWR Piping Exposed to Treated Water

Loss of material due to general, pitting, and crevice corrosion for BWR steel piping components exposed to treated water is applicable to BWR plants only.

3.2.2.2.8.2 Internal Surfaces of Containment Isolation Components

Loss of material due to general, pitting, and crevice corrosion is possible for the internal surfaces of containment isolation piping, piping components, and piping elements exposed to treated water. BVPS does not have one single system that addresses Containment isolation components; rather, the internal surfaces of Containment isolation piping and components exposed to treated water are evaluated with their parent system. If loss of material due to pitting and crevice corrosion is applicable, an appropriate aging management program is credited.

3.2.2.2.8.3 Steel Piping Components Exposed to Lubricating Oil

Loss of material due to general, pitting, and crevice corrosion could occur for steel piping, piping components, and piping elements exposed to lubricating oil. The ESF Systems at BVPS do not contain steel piping components exposed to lubricating oil. Charging / high-head safety injection components are evaluated in the CVCS (Section 2.3.3.5) and are compared to NUREG-1801 rows from the Auxiliary Systems chapter.

3.2.2.2.9 Loss of Material Due to General, Pitting, Crevice, and Microbiologically- Influenced Corrosion (MIC)

Loss of material due to general, pitting, crevice, and MIC could occur for steel piping, piping components, and piping elements buried in soil regardless of the presence of pipe coating or wrapping. The ESF Systems at BVPS do not contain steel piping components exposed to soil. Therefore, this item is not applicable to BVPS.

3.2.2.2.10 Quality Assurance for Aging Management of Nonsafety-related Components

See Appendix B, Section B.1.3, for discussion of BVPS quality assurance procedures and administrative controls for aging management programs.

3.2.2.3 Time-Limited Aging Analyses

The following Time-Limited Aging Analyses (TLAAs) are associated with ESF System components. The section of the application that contains the TLAA review results is indicated in parentheses.

1. Cumulative Fatigue Damage (Section 4.3, Metal Fatigue)

3.2.3 CONCLUSION

The Engineered Safety Features components/commodities having aging effects requiring management have been evaluated, and aging management programs have been selected to manage the aging effects. A description of the aging management programs is provided in Appendix B, along with a demonstration that the identified aging effects will be managed for the period of extended operation.

Therefore, based on the demonstration provided in Appendix B, the effects of aging will be adequately managed so that there is reasonable assurance that the intended functions of Engineered Safety Features components/commodities will be maintained consistent with the current licensing basis during the period of extended operation.

Table 3.2.1
Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Table 3.2.1 : Engineered Safety Features, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1-01	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	Consistent with NUREG-1801, with additional components. Fatigue of metal components is addressed as a TLAA in Section 4.3. Further evaluation is documented in Section 3.2.2.2.1.
3.2.1-02	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. BVPS does not have steel with stainless steel cladding pump casings in the ESF Systems. Further evaluation is documented in Section 3.2.2.2.2.

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1-03	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	Not applicable. The internal surfaces of stainless steel Containment isolation piping and components exposed to treated water were evaluated in the tables associated with their parent system and did not roll-up to this line item.
3.2.1-04	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	Consistent with NUREG-1801. BVPS manages the aging effects with the One-Time Inspection (B.2.30) Program as documented in Section 3.2.2.2.3.2.
3.2.1-05	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	Consistent with NUREG-1801 for different components. BVPS manages the aging effects with a combination of the Water Chemistry (B.2.42) and One-Time Inspection (B.2.30) Programs. See further evaluation in Section 3.2.2.2.3.3.

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
3.2.1-06	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	Not applicable. No BVPS components in the ESF Systems align to this row.
3.2.1-07	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 BVPS RWST tanks are evaluated with their bottom surfaces in contact with soil, and align to Item 3.2.1-04. This row is not applicable to any other tanks in the ESF Systems.
3.2.1-08	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	Consistent with NUREG-1801. BVPS manages the aging effects with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22) Program. Further evaluation is documented in Section 3.2.2.2.3.6.

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1-09	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	Not applicable. No BVPS components in the ESF Systems align to this row.
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	Consistent with NUREG-1801. BVPS manages the aging effect with a combination of the Water Chemistry (B.2.42) and One-Time Inspection (B.2.30) Programs. Further evaluation is documented in Section 3.2.2.2.4.2.
3.2.1-11	BWR only—not used				
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. The BVPS high pressure safety injection (charging) pump miniflow orifices are evaluated in the Chemical and Volume Control System (3.3.2.1.5) and compared to NUREG-1801 rows in the Auxiliary Systems chapter. More details are provided in Section 3.2.2.2.6.
3.2.1-13	BWR only—not used				

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
3.2.1-14	BWR only—not used				
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	Not applicable. The internal surfaces of Containment isolation piping and components exposed to treated water were evaluated in the tables associated with their parent system and did not roll-up to this line item. Further evaluation is documented in Section 3.2.2.2.8.2.
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	Not applicable. No BVPS components in the ESF Systems align to this row. Further evaluation is documented in Section 3.2.2.2.8.3.
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 or Buried Piping and Tanks Inspection	No Yes, detection of aging effects and operating experience are to be further evaluated	Not applicable. No BVPS components in the ESF Systems align to this row. Further evaluation is documented in Section 3.2.2.2.9.

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
3.2.1-18	BWR only—not used				
3.2.1-19	BWR only—not used				
3.2.1-20	Cast austenitic stainless steel piping, piping components, and piping elements exposed to treated water (borated or unborated) >250°C (>482°F)	Loss of fracture toughness due to thermal aging embrittlement	Thermal Aging Embrittlement of CASS	No	Consistent with NUREG-1801. The aging comparison to this BWR item is appropriate for treated (unborated) water systems in PWRs. The aging effect identified applies to BVPS Auxiliary Feedwater turbine casings and specific valve bodies made of CASS, and is managed with the Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) (B.2.41) Program.
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. BVPS does not have high strength closure bolting (ASTM A325 / A490) in the 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. BVPS has no in-scope steel closure bolting exposed to air with steam or water leakage in the ESF Systems. Loss of material due to general corrosion for steel bolting is addressed in Item 3.2.1-23.

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**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. BVPS manages the aging effects with the Bolting Integrity (B.2.6) Program.
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	Not applicable. BVPS did not identify loss of preload as an aging effect for closure bolting. However, BVPS assigned the Bolting Integrity (B.2.6) Program to manage aging of in-scope bolting. The Bolting Integrity Program is consistent with NUREG-1801.
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. BVPS has no in-scope stainless steel piping exposed to closed cycle cooling water >60°C (>140°F) in 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. BVPS has no in-scope steel piping exposed to closed cycle cooling water in the ESF Systems.

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1

Item Number	Component/ Commodity	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. BVPS manages the aging effect with the Closed-Cycle Cooling Water System (B.2.9) Program.
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. BVPS manages the aging effect with the Closed-Cycle Cooling Water System (B.2.9) Program.
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	Not applicable. BVPS has no in-scope copper alloy components exposed to closed cycle cooling water in the ESF Systems.
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. BVPS manages the aging effect with the Closed-Cycle Cooling Water System (B.2.9) Program.

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1

Item Number	Component/ Commodity	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. BVPS manages the aging effects with the External Surfaces Monitoring (B.2.15) Program.

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1

Item Number	Component/ Commodity	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	Consistent with NUREG-1801, with additional components and a different AMP for some components. With the exception of the Fire Protection System, BVPS manages the aging effect with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22) Program for components in the ESF Systems, Auxiliary Systems (Section 3.3), and Steam and Power Conversion Systems (Section 3.4) that have the same material, environment, and aging effect identified. Components in the Fire Protection System (3.3.2.1.18) with the same material, environment, and aging effect are managed by the Fire Water System (B.2.17) Program.

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**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. No BVPS components in the ESF Systems align to this row. The encapsulations for valves in the Containment Depressurization System (3.2.2.1.1) are fabricated of stainless steel, and are evaluated as integral parts of the valves.
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. BVPS has no in-scope steel components exposed to condensation (internal) in 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. The internal surfaces of Containment isolation piping and components exposed to raw water were evaluated in the tables associated with their parent system and did not roll-up to this line item.

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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	Consistent with NUREG-1801. BVPS manages the aging effects with the Open-Cycle Cooling Water System (B.2.32) Program.
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	Consistent with NUREG-1801, with a different AMP assigned. The Unit 1 Recirculation Spray Pumps have been aligned to this item based on material, environment, and aging effect. BVPS manages the aging effect with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22) Program.
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. The internal surfaces of Containment isolation piping and components exposed to raw water were evaluated in the tables associated with their parent system and did not roll-up to this line item.

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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	Consistent with NUREG-1801. BVPS manages the aging effects with the Open-Cycle Cooling Water System (B.2.32) Program.
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	Consistent with NUREG-1801. BVPS manages the aging effects with the Open-Cycle Cooling Water System (B.2.32) Program.
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	Not applicable. BVPS has no in-scope copper alloy >15% Zn components exposed to closed cycle cooling water in the ESF Systems.
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	Not applicable. BVPS has no in-scope gray cast iron components exposed to closed cycle cooling water in the ESF Systems.

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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. BVPS has no in-scope gray cast iron components exposed to soil in the ESF Systems.
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. BVPS has no in-scope 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. BVPS manages the aging effect with the Boric Acid Corrosion (B.2.7) Program.
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. The encapsulations for valves in the Engineered Safety Systems are fabricated of stainless steel, and are evaluated as integral parts of the valves.

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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	Consistent with NUREG-1801, with additional components. BVPS manages the aging effect with the Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) (B.2.41) Program. The regenerative heat exchanger shells are also aligned to this row.
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, with additional components. BVPS manages the aging effect with the Water Chemistry (B.2.42) Program. The RHR heat exchanger channel heads, tubes, and tubesheets are also aligned to this row.

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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, with additional components. BVPS manages the aging effect with the Water Chemistry (B.2.42) Program. The RHR heat exchanger channel heads, tubes, and tubesheets, the low head safety injection seal cooler, the Unit 1 RWST refrigeration heat exchanger shell and tubes, and spent fuel storage racks are also aligned to this row. The aging effect is also applicable to nickel alloy in this environment.
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. Dried air is considered equivalent to air-indoor uncontrolled for aging comparisons for aluminum.
3.2.1-51	Galvanized steel ducting exposed to air - indoor controlled (external)	None	None	NA - No AEM or AMP	Not applicable. BVPS has no in-scope galvanized steel components exposed to air-indoor controlled in the ESF Systems.

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
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	Not applicable. BVPS has no glass components in the ESF systems that are subject to aging management review.
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, with additional components. Some bolting, heat exchanger components, and tube tracks are also aligned to this row. For drained components made of the listed materials, this external NUREG-1801 environment is also considered applicable for comparison of internal aging effects.
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. BVPS has no in-scope steel components exposed to an air-indoor controlled environment in the ESF Systems.

Table 3.2.1 (continued): Engineered Safety Features, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**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.
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, with additional components. Some tanks and the Unit 1 RWST refrigeration heat exchanger tubes also align to this row.
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, with additional components. The aging effect is also applicable to nickel alloy in this environment. Some bolting and heat exchanger components also align to this row.

Table 3.2.2-1
Engineered Safety Features Systems – Containment Depressurization System – Summary of Aging Management Evaluation

Table 3.2.2-1 : Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	C
2	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - outdoor-EXT	None	None	N/A	N/A	G

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
3	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	C
4	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	N/A	N/A	G
5	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	V.E-4 (EP-25)	3.2.1-23	A

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
6	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - outdoor-EXT	Loss of material	Bolting Integrity (B.2.6)	V.E-1 (EP-1)	3.2.1-23	A
7	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.E-2 (E-41)	3.2.1-45	A
8	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Condensation -EXT	Loss of material	Bolting Integrity (B.2.6)	VII.D-1 (A-103)	3.3.1-44	A
9	Bolting	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	C

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
10	Bolting	Pressure boundary	Stainless steel	Air - outdoor-EXT	None	None	N/A	N/A	G
11	Bolting	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	C
12	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	V.E-4 (EP-25)	3.2.1-23	A
13	Bolting	Pressure boundary	Steel	Air - outdoor-EXT	Loss of material	Bolting Integrity (B.2.6)	V.E-1 (EP-1)	3.2.1-23	A
14	Bolting	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.E-2 (E-41)	3.2.1-45	A
15	Flexible hose	Leakage boundary (spatial)	Nickel alloy	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A, 204
16	Flexible hose	Leakage boundary (spatial)	Nickel alloy	Air - indoor uncontrolled-EXT	None	None	V.F-11 (EP-17)	3.2.1-53	A
17	Flexible hose	Leakage boundary (spatial)	Nickel alloy	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A, 204

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
18	Flexible hose	Pressure boundary	Nickel alloy	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A, 204
19	Flexible hose	Pressure boundary	Nickel alloy	Air - indoor uncontrolled-EXT	None	None	V.F-11 (EP-17)	3.2.1-53	A
20	Flexible hose	Pressure boundary	Nickel alloy	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A, 204
21	Heat exchanger (pump seal cooler)	Pressure boundary and Heat transfer	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	V.D2-28 (EP-32)	3.2.1-05	C, 205
22	Heat exchanger (pump seal cooler)	Pressure boundary and Heat transfer	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	V.D2-28 (EP-32)	3.2.1-05	C, 205
23	Heat exchanger (pump seal cooler)	Pressure boundary and Heat transfer	Stainless steel	Treated water	Reduction of heat transfer	One-Time Inspection (B.2.30)	V.A-16 (EP-34)	3.2.1-10	A
24	Heat exchanger (pump seal cooler)	Pressure boundary and Heat transfer	Stainless steel	Treated water	Reduction of heat transfer	Water Chemistry (B.2.42)	V.A-16 (EP-34)	3.2.1-10	A

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
25	Heat exchanger (pump seal cooler)	Pressure boundary and Heat transfer	Stainless steel	Air - indoor uncontrolled-EXT	Reduction of heat transfer	External Surfaces Monitoring (B.2.15)	N/A	N/A	H
26	Heat exchanger (pump seal cooler)	Pressure boundary and Heat transfer	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	C
27	Heat exchanger (RWST cooler - shell)	Leakage boundary (spatial)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	V.A-9 (E-17)	3.2.1-27	A
28	Heat exchanger (RWST cooler - shell)	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.A-4 (E-28)	3.2.1-45	A
29	Heat exchanger (RWST cooler - shell)	Leakage boundary (spatial)	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	V.E-10 (E-46)	3.2.1-31	A
30	Heat Exchanger (Unit 1 RSHX channel heads)	Pressure boundary	Steel	Raw water	Loss of material	Open-Cycle Cooling Water System (B.2.32)	V.A-10 (E-18)	3.2.1-36	A
31	Heat Exchanger (Unit 1 RSHX channel heads)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	V.A-1 (E-26)	3.2.1-31	A

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
32	Heat Exchanger (Unit 1 RSHX channel heads)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.A-4 (E-28)	3.2.1-45	A
33	Heat exchanger (Unit 1 RSHX shell)	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	V.F-12 (EP-18)	3.2.1-53	C, 203
34	Heat exchanger (Unit 1 RSHX shell)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	C
35	Heat exchanger (Unit 1 RSHX shell)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
36	Heat exchanger (Unit 1 RSHX tube)	Pressure boundary and Heat transfer	Stainless steel	Raw water	Loss of material	Open-Cycle Cooling Water System (B.2.32)	V.A-8 (E-20)	3.2.1-39	A
37	Heat exchanger (Unit 1 RSHX tube)	Pressure boundary and Heat transfer	Stainless steel	Raw water	Reduction of heat transfer	Open-Cycle Cooling Water System (B.2.32)	V.A-15 (E-21)	3.2.1-40	A
38	Heat exchanger (Unit 1 RSHX tube)	Pressure boundary and Heat transfer	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	C

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
39	Heat exchanger (Unit 1 RWST refrig shell)	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	C
40	Heat exchanger (Unit 1 RWST refrig shell)	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	C
41	Heat exchanger (Unit 1 RWST refrig shell)	Leakage boundary (spatial)	Stainless steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	N/A	N/A	H
42	Heat exchanger (Unit 1 RWST refrig tube)	Leakage boundary (spatial)	Stainless steel	Gas	None	None	V.F-15 (EP-22)	3.2.1-56	C
43	Heat exchanger (Unit 1 RWST refrig tube)	Leakage boundary (spatial)	Stainless steel	Treated borated water-EXT	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	C
44	Heat exchanger (Unit 2 RSHX channel head)	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	C
45	Heat exchanger (Unit 2 RSHX channel head)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	V.A-1 (E-26)	3.2.1-31	A

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
46	Heat exchanger (Unit 2 RSHX channel head)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.A-4 (E-28)	3.2.1-45	A
47	Heat exchanger (Unit 2 RSHX shell)	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	V.F-12 (EP-18)	3.2.1-53	C, 203
48	Heat exchanger (Unit 2 RSHX shell)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	C
49	Heat exchanger (Unit 2 RSHX shell)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	C
50	Heat exchanger (Unit 2 RSHX tube)	Pressure boundary and Heat transfer	Stainless steel	Air - indoor uncontrolled	None	None	V.F-12 (EP-18)	3.2.1-53	C, 203
51	Heat exchanger (Unit 2 RSHX tube)	Pressure boundary and Heat transfer	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	C
52	Orifice	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
53	Orifice	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
54	Orifice	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
55	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air - indoor uncontrolled	None	None	V.F-12 (EP-18)	3.2.1-53	A, 203
56	Orifice	Pressure boundary and Flow restriction	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A
57	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
58	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
59	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A
60	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	V.D2-28 (EP-32)	3.2.1-05	C, 205
61	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	V.D2-28 (EP-32)	3.2.1-05	C, 205

Table 3.2.2-1 (continued): Containment Depressurization System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
62	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
63	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - outdoor-EXT	None	None	N/A	N/A	G
64	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
65	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	N/A	N/A	G
66	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	V.F-12 (EP-18)	3.2.1-53	A, 203
67	Piping	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A
68	Piping	Pressure boundary	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	V.D2-28 (EP-32)	3.2.1-05	C, 205
69	Piping	Pressure boundary	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	V.D2-28 (EP-32)	3.2.1-05	C, 205
70	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
71	Piping	Pressure boundary	Stainless steel	Air - outdoor-EXT	None	None	N/A	N/A	G
72	Piping	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
73	Piping	Pressure boundary	Stainless steel	Concrete-EXT	None	None	V.F-14 (EP-20)	3.2.1-55	A
74	Piping	Pressure boundary	Stainless steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	N/A	N/A	G
75	Pump casing (Quench Spray)	Pressure boundary	Cast austenitic stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A
76	Pump casing (Quench Spray)	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
77	Pump casing (Quench Spray)	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
78	Pump casing (Recirc Spray)	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled	None	None	V.F-12 (EP-18)	3.2.1-53	A, 203
79	Pump casing (Recirc Spray)	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
80	Pump casing (Recirc Spray)	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
81	Pump casing (Unit 1 Chem Add)	Leakage boundary (spatial)	Cast austenitic stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	V.D2-28 (EP-32)	3.2.1-05	C, 205
82	Pump casing (Unit 1 Chem Add)	Leakage boundary (spatial)	Cast austenitic stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	V.D2-28 (EP-32)	3.2.1-05	C, 205
83	Pump casing (Unit 1 Chem Add)	Leakage boundary (spatial)	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
84	Pump casing (Unit 1 Chem Injection)	Pressure boundary	Cast austenitic stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	V.D2-28 (EP-32)	3.2.1-05	C, 205
85	Pump casing (Unit 1 Chem Injection)	Pressure boundary	Cast austenitic stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	V.D2-28 (EP-32)	3.2.1-05	C, 205

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
86	Pump casing (Unit 1 Chem Injection)	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
87	Pump casing (Unit 1 Chem Injection)	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
88	Pump casing (Unit 1 inside Recirc Spray)	Pressure boundary	Cast austenitic stainless steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.D1-25 (EP-55)	3.2.1-37	E, 207
89	Pump casing (Unit 1 inside Recirc Spray)	Pressure boundary	Cast austenitic stainless steel	Raw water-EXT	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.D1-25 (EP-55)	3.2.1-37	E, 207
90	Pump casing (Unit 1 RWST recirc)	Leakage boundary (spatial)	Cast austenitic stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
91	Pump casing (Unit 1 RWST recirc)	Leakage boundary (spatial)	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
92	Pump casing (Unit 1 RWST recirc)	Leakage boundary (spatial)	Cast austenitic stainless steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	N/A	N/A	G
93	Pump casing (Unit 2 Chem Add)	Leakage boundary (spatial)	Nickel alloy	Treated water	Loss of material	Water Chemistry (B.2.42)	V.D2-28 (EP-32)	3.2.1-05	C, 205, 204
94	Pump casing (Unit 2 Chem Add)	Leakage boundary (spatial)	Nickel alloy	Treated water	Loss of material	One-Time Inspection (B.2.30)	V.D2-28 (EP-32)	3.2.1-05	C, 205, 204
95	Pump casing (Unit 2 Chem Add)	Leakage boundary (spatial)	Nickel alloy	Air - indoor uncontrolled-EXT	None	None	V.F-11 (EP-17)	3.2.1-53	A
96	Pump casing (Unit 2 Chem Add)	Leakage boundary (spatial)	Nickel alloy	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A, 204
97	Pump casing (Unit 2 Chem Injection)	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A

Table 3.2.2-1 (continued): Containment Depressurization System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
98	Pump casing (Unit 2 Chem Injection)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
99	Pump casing (Unit 2 Chem Injection)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
100	Pump casing (Unit 2 RWST recirc)	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A
101	Pump casing (Unit 2 RWST recirc)	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
102	Pump casing (Unit 2 RWST recirc)	Leakage boundary (spatial)	Stainless steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	N/A	N/A	H
103	Spray nozzle	Direct flow	Copper alloy >15% Zn	Air - indoor uncontrolled	None	None	V.F-3 (EP-10)	3.2.1-53	A, 203
104	Spray nozzle	Direct flow	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	V.F-3 (EP-10)	3.2.1-53	A

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
105	Spray nozzle	Direct flow	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.E-11 (EP-38)	3.2.1-45	A
106	Spray nozzle	Direct flow	Stainless steel	Air - indoor uncontrolled	None	None	V.F-12 (EP-18)	3.2.1-53	A, 203
107	Spray nozzle	Direct flow	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
108	Spray nozzle	Direct flow	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
109	Strainer body	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A
110	Strainer body	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
111	Strainer body	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-53	A

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
112	Strainer body	Pressure boundary	Cast austenitic stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A
113	Strainer body	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
114	Strainer body	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-53	A
115	Strainer body	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A
116	Strainer body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
117	Strainer body	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-53	A
118	Strainer element	Filtration	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
119	Tank (seal accumulators)	Pressure boundary	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	V.D2-28 (EP-32)	3.2.1-05	C, 205
120	Tank (seal accumulators)	Pressure boundary	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	V.D2-28 (EP-32)	3.2.1-05	C, 205
121	Tank (seal accumulators)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
122	Tank (seal accumulators)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
123	Tank (Chem Add)	Pressure boundary	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-26 (EP-53)	3.2.1-08	E
124	Tank (Chem Add)	Pressure boundary	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	V.D2-28 (EP-32)	3.2.1-05	C, 205
125	Tank (Chem Add)	Pressure boundary	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	V.D2-28 (EP-32)	3.2.1-05	C, 205
126	Tank (Chem Add)	Pressure boundary	Stainless steel	Air - outdoor-EXT	None	None	N/A	N/A	G

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
127	Tank (Chem Add)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
128	Tank (RWST)	Pressure boundary	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-26 (EP-53)	3.2.1-08	E
129	Tank (RWST)	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A
130	Tank (RWST)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
131	Tank (RWST)	Pressure boundary	Stainless steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	N/A	N/A	G
132	Tank (RWST)	Pressure boundary	Stainless steel	Soil-EXT	Loss of material	One-Time Inspection (B.2.30)	V.D1-26 (EP-31)	3.2.1-04	E
133	Tubing	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
134	Tubing	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
135	Tubing	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
136	Tubing	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A
137	Tubing	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
138	Tubing	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
139	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Cast austenitic stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
140	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Cast austenitic stainless steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	N/A	N/A	G
141	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A
142	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	V.D2-28 (EP-32)	3.2.1-05	C, 205

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
143	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	V.D2-28 (EP-32)	3.2.1-05	C, 205
144	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
145	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - outdoor-EXT	None	None	N/A	N/A	G

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
146	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
147	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	N/A	N/A	G
148	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	V.F-12 (EP-18)	3.2.1-53	A, 203
149	Valve body	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.A-27 (EP-41)	3.2.1-49	A
150	Valve body	Pressure boundary	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	V.D2-28 (EP-32)	3.2.1-05	C, 205
151	Valve body	Pressure boundary	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	V.D2-28 (EP-32)	3.2.1-05	C, 205

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
152	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
153	Valve body	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
154	Valve body	Pressure boundary	Stainless steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	N/A	N/A	G
155	Valve body (Unit 2 Chem Injection RV)	Pressure boundary	Steel	Treated borated water	Loss of material	One-Time Inspection (B.2.30)	N/A	N/A	G, 201
156	Valve body (Unit 2 Chem Injection RV)	Pressure boundary	Steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	N/A	N/A	G, 201
157	Valve body (Unit 2 Chem Injection RV)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	V.A-1 (E-26)	3.2.1-31	A
158	Valve body (Unit 2 Chem Injection RV)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.A-4 (E-28)	3.2.1-45	A
159	Valve body (Unit 2 RWST isolation to SIS)	Pressure boundary	Steel	Treated borated water	Loss of material	One-Time Inspection (B.2.30)	N/A	N/A	G, 206

Table 3.2.2-1 (continued): Containment Depressurization System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
160	Valve body (Unit 2 RWST isolation to SIS)	Pressure boundary	Steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	N/A	N/A	G, 206
161	Valve body (Unit 2 RWST isolation to SIS)	Pressure boundary	Steel	Air - outdoor-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	V.E-8 (E-45)	3.2.1-31	A
162	Valve body (Unit 2 RWST isolation to SIS)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.A-4 (E-28)	3.2.1-45	A

Table 3.2.2-2
Engineered Safety Features Systems –
Residual Heat Removal System –
Summary of Aging Management Evaluation

Table 3.2.2-2 : Residual Heat Removal System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	Cumulative fatigue damage	TLAA	N/A	N/A	H
2	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	C

Table 3.2.2-2 (continued): Residual Heat Removal System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
3	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	C
4	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Cumulative fatigue damage	TLAA	N/A	N/A	H
5	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	V.E-4 (EP-25)	3.2.1-23	A

Table 3.2.2-2 (continued): Residual Heat Removal System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
6	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.E-2 (E-41)	3.2.1-45	A
7	Bolting	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	Cumulative fatigue damage	TLAA	N/A	N/A	H
8	Bolting	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	C
9	Bolting	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	C
10	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Cumulative fatigue damage	TLAA	N/A	N/A	H
11	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	V.E-4 (EP-25)	3.2.1-23	A

Table 3.2.2-2 (continued): Residual Heat Removal System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
12	Bolting	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.E-2 (E-41)	3.2.1-45	A
13	Flexible hose	Pressure boundary	Nickel alloy	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	V.D1-27 (E-13)	3.2.1-01	A, 204
14	Flexible hose	Pressure boundary	Nickel alloy	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A, 204
15	Flexible hose	Pressure boundary	Nickel alloy	Air - indoor uncontrolled-EXT	None	None	V.F-11 (EP-17)	3.2.1-53	A
16	Flexible hose	Pressure boundary	Nickel alloy	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A, 204
17	Heat exchanger (shell)	Pressure boundary	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	V.D1-6 (E-17)	3.2.1-27	A
18	Heat exchanger (shell)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	V.E-7 (E-44)	3.2.1-31	A

Table 3.2.2-2 (continued): Residual Heat Removal System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
19	Heat exchanger (shell)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.E-9 (E-28)	3.2.1-45	A
20	Heat exchanger (Unit 1 channel head)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	C
21	Heat exchanger (Unit 1 channel head)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	C
22	Heat exchanger (Unit 1 channel head)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
23	Heat exchanger (Unit 1 tube and tubesheet)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	C
24	Heat exchanger (Unit 1 tube and tubesheet)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	C

Table 3.2.2-2 (continued): Residual Heat Removal System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
25	Heat exchanger (Unit 1 tube and tubesheet)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Reduction of heat transfer	Water Chemistry (B.2.42)	N/A	N/A	H
26	Heat exchanger (Unit 1 tube and tubesheet)	Pressure boundary and Heat transfer	Stainless steel	Closed cycle cooling water-EXT	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	V.D1-4 (E-19)	3.2.1-28	A
27	Heat exchanger (Unit 1 tube and tubesheet)	Pressure boundary and Heat transfer	Stainless steel	Closed cycle cooling water-EXT	Reduction of heat transfer	Closed-Cycle Cooling Water System (B.2.9)	V.D1-9 (EP-35)	3.2.1-30	A
28	Heat exchanger (Unit 2 channel head)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	C
29	Heat exchanger (Unit 2 channel head)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	V.D1-27 (E-13)	3.2.1-01	C
30	Heat exchanger (Unit 2 channel head)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	C

Table 3.2.2-2 (continued): Residual Heat Removal System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
31	Heat exchanger (Unit 2 channel head)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
32	Heat exchanger (Unit 2 channel head)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
33	Heat exchanger (Unit 2 tube and tubesheet)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	C
34	Heat exchanger (Unit 2 tube and tubesheet)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	V.D1-27 (E-13)	3.2.1-01	C
35	Heat exchanger (Unit 2 tube and tubesheet)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	C
36	Heat exchanger (Unit 2 tube and tubesheet)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Reduction of heat transfer	Water Chemistry (B.2.42)	N/A	N/A	H

Table 3.2.2-2 (continued): Residual Heat Removal System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
37	Heat exchanger (Unit 2 tube and tubesheet)	Pressure boundary and Heat transfer	Stainless steel	Closed cycle cooling water-EXT	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	V.D1-4 (E-19)	3.2.1-28	A
38	Heat exchanger (Unit 2 tube and tubesheet)	Pressure boundary and Heat transfer	Stainless steel	Closed cycle cooling water-EXT	Reduction of heat transfer	Closed-Cycle Cooling Water System (B.2.9)	V.D1-9 (EP-35)	3.2.1-30	A
39	Orifice	Pressure boundary and Flow restriction	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A
40	Orifice	Pressure boundary and Flow restriction	Stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	V.D1-27 (E-13)	3.2.1-01	A
41	Orifice	Pressure boundary and Flow restriction	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
42	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A

Table 3.2.2-2 (continued): Residual Heat Removal System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
43	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
44	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A
45	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	V.D1-27 (E-13)	3.2.1-01	A
46	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A

Table 3.2.2-2 (continued): Residual Heat Removal System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
47	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
48	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
49	Piping	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A
50	Piping	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	V.D1-27 (E-13)	3.2.1-01	A

Table 3.2.2-2 (continued): Residual Heat Removal System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
51	Piping	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
52	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
53	Piping	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
54	Piping (drained)	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled	None	None	V.F-12 (EP-18)	3.2.1-53	A, 203
55	Piping (drained)	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Gas	None	None	V.F-15 (EP-22)	3.2.1-56	A

Table 3.2.2-2 (continued): Residual Heat Removal System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
56	Piping (drained)	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
57	Piping (drained)	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
58	Piping (drained)	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	V.F-12 (EP-18)	3.2.1-53	A, 203
59	Piping (drained)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
60	Piping (drained)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A

Table 3.2.2-2 (continued): Residual Heat Removal System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
61	Pump casing (Unit 1 only)	Pressure boundary	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A
62	Pump casing (Unit 1 only)	Pressure boundary	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
63	Pump casing (Unit 1 only)	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
64	Pump casing (Unit 1 only)	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
65	Pump casing (Unit 2 only)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A
66	Pump casing (Unit 2 only)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A

Table 3.2.2-2 (continued): Residual Heat Removal System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
67	Pump casing (Unit 2 only)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
68	Pump casing (Unit 2 only)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
69	Tubing	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A
70	Tubing	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	V.D1-27 (E-13)	3.2.1-01	A
71	Tubing	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
72	Tubing	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
73	Tubing	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A

Table 3.2.2-2 (continued): Residual Heat Removal System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
74	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A
75	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	V.D1-27 (E-13)	3.2.1-01	A
76	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A

Table 3.2.2-2 (continued): Residual Heat Removal System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
77	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
78	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
79	Valve body	Pressure boundary	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A
80	Valve body	Pressure boundary	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	V.D1-27 (E-13)	3.2.1-01	A

Table 3.2.2-2 (continued): Residual Heat Removal System									
Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
81	Valve body	Pressure boundary	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
82	Valve body	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
83	Valve body	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
84	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	V.F-12 (EP-18)	3.2.1-53	A, 203
85	Valve body	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A
86	Valve body	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	V.D1-27 (E-13)	3.2.1-01	A

Table 3.2.2-2 (continued): Residual Heat Removal System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
87	Valve body	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
88	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
89	Valve body	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
90	Valve body (bonnet)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	V.E-7 (E-44)	3.2.1-31	A, 202
91	Valve body (bonnet)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.E-9 (E-28)	3.2.1-45	A, 202

Table 3.2.2-3
Engineered Safety Features Systems –
Safety Injection System –
Summary of Aging Management Evaluation

Table 3.2.2-3 : Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	C
2	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	C

Table 3.2.2-3 (continued): Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
3	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	V.E-4 (EP-25)	3.2.1-23	A
4	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.E-2 (E-41)	3.2.1-45	A
5	Bolting	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	C
6	Bolting	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	C
7	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	V.E-4 (EP-25)	3.2.1-23	A

Table 3.2.2-3 (continued): Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
8	Bolting	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.E-2 (E-41)	3.2.1-45	A
9	Flexible hose	Leakage boundary (spatial)	Nickel alloy	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
10	Flexible hose	Leakage boundary (spatial)	Nickel alloy	Air - indoor uncontrolled-EXT	None	None	V.F-11 (EP-17)	3.2.1-53	A
11	Flexible hose	Leakage boundary (spatial)	Nickel alloy	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A, 204
12	Flexible hose	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
13	Flexible hose	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
14	Flexible hose	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
15	Flexible hose	Pressure boundary	Nickel alloy	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A

Table 3.2.2-3 (continued): Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
16	Flexible hose	Pressure boundary	Nickel alloy	Air - indoor uncontrolled-EXT	None	None	V.F-11 (EP-17)	3.2.1-53	A
17	Flexible hose	Pressure boundary	Nickel alloy	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A, 204
18	Flexible hose	Pressure boundary	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
19	Flexible hose	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
20	Flexible hose	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
21	Flexible hose	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
22	Heat exchanger (LHSI seal cooler)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	C

Table 3.2.2-3 (continued): Safety Injection System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
23	Heat exchanger (LHSI seal cooler)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water	Reduction of heat transfer	One-Time Inspection (B.2.30)	N/A	N/A	H
24	Heat exchanger (LHSI seal cooler)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water	Reduction of heat transfer	Water Chemistry (B.2.42)	N/A	N/A	H
25	Heat exchanger (LHSI seal cooler)	Pressure boundary and Heat transfer	Stainless steel	Air - indoor uncontrolled-EXT	Reduction of heat transfer	External Surfaces Monitoring (B.2.15)	N/A	N/A	H
26	Heat exchanger (LHSI seal cooler)	Pressure boundary and Heat transfer	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	C
27	Orifice	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
28	Orifice	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A

Table 3.2.2-3 (continued): Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
29	Orifice	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
30	Orifice	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
31	Orifice	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
32	Orifice	Pressure boundary and Flow restriction	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
33	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
34	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A

Table 3.2.2-3 (continued): Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
35	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled	None	None	V.F-12 (EP-18)	3.2.1-53	A, 203
36	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
37	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A

Table 3.2.2-3 (continued): Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
38	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A
39	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
40	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A

Table 3.2.2-3 (continued): Safety Injection System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
41	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
42	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Gas	None	None	V.F-18 (EP-7)	3.2.1-56	A
43	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	V.E-7 (E-44)	3.2.1-31	A

Table 3.2.2-3 (continued): Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
44	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.E-9 (E-28)	3.2.1-45	A
45	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	V.F-12 (EP-18)	3.2.1-53	A, 203
46	Piping	Pressure boundary	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
47	Piping	Pressure boundary	Stainless steel	Gas	None	None	V.F-15 (EP-22)	3.2.1-56	A
48	Piping	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
49	Piping	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A
50	Piping	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A

Table 3.2.2-3 (continued): Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
51	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
52	Piping	Pressure boundary	Stainless steel	Air - outdoor-EXT	None	None	N/A	N/A	G
53	Piping	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
54	Piping	Pressure boundary	Stainless steel	Concrete-EXT	None	None	V.F-14 (EP-20)	3.2.1-55	A
55	Piping	Pressure boundary	Steel	Gas	None	None	V.F-18 (EP-7)	3.2.1-56	A
56	Piping	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	V.E-7 (E-44)	3.2.1-31	A
57	Piping	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.E-9 (E-28)	3.2.1-45	A
58	Pump casing	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A

Table 3.2.2-3 (continued): Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
59	Pump casing	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
60	Pump casing	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
61	Pump casing	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
62	Pump casing	Pressure boundary	Cast austenitic stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
63	Pump casing	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
64	Pump casing	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
65	Pump casing	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A

Table 3.2.2-3 (continued): Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
66	Pump casing	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
67	Pump casing	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
68	Tank	Leakage boundary (spatial)	Steel with stainless steel cladding	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.D1-29 (EP-53)	3.2.1-08	E
69	Tank	Leakage boundary (spatial)	Steel with stainless steel cladding	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A
70	Tank	Leakage boundary (spatial)	Steel with stainless steel cladding	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
71	Tank	Leakage boundary (spatial)	Steel with stainless steel cladding	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	V.E-7 (E-44)	3.2.1-31	A

Table 3.2.2-3 (continued): Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
72	Tank	Leakage boundary (spatial)	Steel with stainless steel cladding	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.E-9 (E-28)	3.2.1-45	A
73	Tank	Pressure boundary	Stainless steel	Gas	None	None	V.F-15 (EP-22)	3.2.1-56	C
74	Tank	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
75	Tank	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	C
76	Tank	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	C
77	Tank	Pressure boundary	Steel with stainless steel cladding	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
78	Tank	Pressure boundary	Steel with stainless steel cladding	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A

Table 3.2.2-3 (continued): Safety Injection System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
79	Tank	Pressure boundary	Steel with stainless steel cladding	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
80	Tank	Pressure boundary	Steel with stainless steel cladding	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	V.E-7 (E-44)	3.2.1-31	A
81	Tank	Pressure boundary	Steel with stainless steel cladding	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.E-9 (E-28)	3.2.1-45	A
82	Tubing	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
83	Tubing	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
84	Tubing	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
85	Tubing	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A

Table 3.2.2-3 (continued): Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
86	Tubing	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
87	Tubing	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
88	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
89	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Gas	None	None	V.F-15 (EP-22)	3.2.1-56	A

Table 3.2.2-3 (continued): Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
90	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
91	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A
92	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A

Table 3.2.2-3 (continued): Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
93	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
94	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
95	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Gas	None	None	V.F-18 (EP-7)	3.2.1-56	A

Table 3.2.2-3 (continued): Safety Injection System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
96	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	V.E-7 (E-44)	3.2.1-31	A
97	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.E-9 (E-28)	3.2.1-45	A
98	Valve body	Pressure boundary	Cast austenitic stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
99	Valve body	Pressure boundary	Cast austenitic stainless steel	Gas	None	None	V.F-15 (EP-22)	3.2.1-56	A

Table 3.2.2-3 (continued): Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
100	Valve body	Pressure boundary	Cast austenitic stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
101	Valve body	Pressure boundary	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A
102	Valve body	Pressure boundary	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
103	Valve body	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A
104	Valve body	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
105	Valve body	Pressure boundary	Copper alloy >15% Zn	Dried air	None	None	VII.J-3 (AP-8)	3.3.1-98	A

Table 3.2.2-3 (continued): Safety Injection System									
Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
106	Valve body	Pressure boundary	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	V.F-3 (EP-10)	3.2.1-53	A
107	Valve body	Pressure boundary	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.E-11 (EP-38)	3.2.1-45	A
108	Valve body	Pressure boundary	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
109	Valve body	Pressure boundary	Stainless steel	Gas	None	None	V.F-15 (EP-22)	3.2.1-56	A
110	Valve body	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
111	Valve body	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	V.D1-31 (E-12)	3.2.1-48	A
112	Valve body	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	V.D1-30 (EP-41)	3.2.1-49	A
113	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	V.F-12 (EP-18)	3.2.1-53	A

Table 3.2.2-3 (continued): Safety Injection System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
114	Valve body	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	V.F-13 (EP-19)	3.2.1-57	A
115	Valve body	Pressure boundary	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A
116	Valve body	Pressure boundary	Steel	Gas	None	None	V.F-18 (EP-7)	3.2.1-56	A
117	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	V.E-7 (E-44)	3.2.1-31	A
118	Valve body	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	V.E-9 (E-28)	3.2.1-45	A

Notes for Tables 3.2.2-1 through 3.2.2-3

Generic notes

A. Consistent with NUREG-1801 item for component, material, environment and aging effect. AMP is consistent with NUREG-1801 AMP.

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

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

D. Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP has some exceptions to NUREG-1801 AMP.

E. Consistent with NUREG-1801 item for material, environment and aging effect, but a different aging management program is credited or NUREG-1801 identifies a plant-specific aging management program.

F. Material not in NUREG-1801 (Chapter V) for this component.

G. Environment not in NUREG-1801 (Chapter V) for this component and material.

H. Aging effect not in NUREG-1801 (Chapter V) for this component, material and environment combination.

I. Aging effect in NUREG-1801 (Chapter V) 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 (Chapter V).

Plant-specific notes

201. Steel chemical injection pump relief valves have been evaluated for use in this environment.

202. These RHR relief valves have carbon steel bonnets that are normally not in contact with the process borated water. Only the stainless steel portion of the relief valves is exposed to a liquid environment.

203. For the purpose of NUREG-1801 comparison, this external environment NUREG-1801 row is also applicable to the internal surface for this material.

204. For the purpose of NUREG-1801 comparison, the aging effect is also applicable to nickel alloy in this environment.

205. For the purpose of NUREG-1801 comparison, this row for a BWR system is also applicable to PWR systems with treated (unborated) water.
206. The internals and flange face of the RWST isolation valve to Safety Injection are covered by a bonded rubber material and should not be in contact with borated water. For aging evaluations, the valve body is assumed to be in contact with the system fluid.
207. This raw water environment is associated with aerated drains within a sump pit. The Open Cycle Cooling Water System program is not applicable to this environment.

3.3 AGING MANAGEMENT OF 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 listed systems are addressed in this chapter. A link to the associated system description section in Chapter 2 is also provided.

- Area Ventilation System—Control Area (Section 3.3.2.1.1) / (Section 2.3.3.1)
- Area Ventilation System—Plant Areas (Section 3.3.2.1.2) / (Section 2.3.3.2)
- Boron Recovery and Primary Grade Water System (Section 3.3.2.1.3) / (Section 2.3.3.3)
- Building and Yard Drains System (Section 3.3.2.1.4) / (Section 2.3.3.4)
- Chemical and Volume Control System (Section 3.3.2.1.5) / (Section 2.3.3.5)
- Chilled Water System (Section 3.3.2.1.6) / (Section 2.3.3.6)
- Compressed Air System (Section 3.3.2.1.7) / (Section 2.3.3.7)
- Containment System (Section 3.3.2.1.8) / (Section 2.3.3.8)
- Containment Vacuum and Leak Monitoring System (Section 3.3.2.1.9) / (Section 2.3.3.9)
- Domestic Water System (Section 3.3.2.1.10) / (Section 2.3.3.10)
- Emergency Diesel Generators and Air Intake and Exhaust System (Section 3.3.2.1.11) / (Section 2.3.3.11)
- Emergency Diesel Generators—Air Start System (Section 3.3.2.1.12) / (Section 2.3.3.12)
- Emergency Diesel Generators—Crankcase Vacuum System (Section 3.3.2.1.13) / (Section 2.3.3.13)
- Emergency Diesel Generators—Fuel Oil System (Section 3.3.2.1.14) / (Section 2.3.3.14)
- Emergency Diesel Generators—Lube Oil System (Section 3.3.2.1.15) / (Section 2.3.3.15)
- Emergency Diesel Generators—Water Cooling System (Section 3.3.2.1.16) / (Section 2.3.3.16)
- Emergency Response Facility Substation System (Common) (Section 3.3.2.1.17) / (Section 2.3.3.17)
- Fire Protection System (Section 3.3.2.1.18) / (Section 2.3.3.18)

- Fuel Pool Cooling and Purification System (Section 3.3.2.1.19) / (Section 2.3.3.19)
- Gaseous Waste Disposal System (Section 3.3.2.1.20) / (Section 2.3.3.20)
- Liquid Waste Disposal System (Section 3.3.2.1.21) / (Section 2.3.3.21)
- Post-Accident Sample System (Section 3.3.2.1.22) / (Section 2.3.3.22)
- Post-Design Basis Accident Hydrogen Control System (Section 3.3.2.1.23) / (Section 2.3.3.23)
- Primary Component and Neutron Shield Tank Cooling Water System (Section 3.3.2.1.24) / (Section 2.3.3.24)
- Radiation Monitoring System (Section 3.3.2.1.25) / (Section 2.3.3.25)
- Reactor Plant Sample System (Section 3.3.2.1.26) / (Section 2.3.3.26)
- Reactor Plant Vents and Drains (Section 3.3.2.1.27) / (Section 2.3.3.27)
- River Water System (Unit 1 only) (Section 3.3.2.1.28) / (Section 2.3.3.28)
- Security Diesel Generator System (Common) (Section 3.3.2.1.29) / (Section 2.3.3.29)
- Service Water System (Unit 2 only) (Section 3.3.2.1.30) / (Section 2.3.3.30)
- Solid Waste Disposal System (Section 3.3.2.1.31) / (Section 2.3.3.31)
- Supplementary Leak Collection and Release System (Section 3.3.2.1.32) / (Section 2.3.3.32)

Table 3.3.1, *Summary of Aging Management Evaluations in Chapter VII of NUREG-1801 for Auxiliary Systems*, provides the summary of the programs evaluated in NUREG-1801 [Reference 1.3-5] 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 Area Ventilation System—Control Area – Summary of Aging Management Evaluation
- Table 3.3.2-2 Area Ventilation System—Plant Areas – Summary of Aging Management Evaluation

- Table 3.3.2-18 Fire Protection System – Summary of Aging Management Evaluation
- Table 3.3.2-19 Fuel Pool Cooling and Purification System – Summary of Aging Management Evaluation
- Table 3.3.2-20 Gaseous Waste Disposal System – Summary of Aging Management Evaluation
- Table 3.3.2-21 Liquid Waste Disposal System – Summary of Aging Management Evaluation
- Table 3.3.2-22 Post-Accident Sample System – Summary of Aging Management Evaluation
- Table 3.3.2-23 Post-Design Basis Accident Hydrogen Control System – Summary of Aging Management Evaluation
- Table 3.3.2-24 Primary Component and Neutron Shield Tank Cooling Water System – Summary of Aging Management Evaluation
- Table 3.3.2-25 Radiation Monitoring System – Summary of Aging Management Evaluation
- Table 3.3.2-26 Reactor Plant Sample System – Summary of Aging Management Evaluation
- Table 3.3.2-27 Reactor Plant Vents and Drains – Summary of Aging Management Evaluation
- Table 3.3.2-28 River Water System (Unit 1 only) – Summary of Aging Management Evaluation
- Table 3.3.2-29 Security Diesel Generator System (Common) – Summary of Aging Management Evaluation
- Table 3.3.2-30 Service Water System (Unit 2 only) – Summary of Aging Management Evaluation
- Table 3.3.2-31 Solid Waste Disposal System – Summary of Aging Management Evaluation
- Table 3.3.2-32 Supplementary Leak Collection and Release System – Summary of Aging Management Evaluation

3.3.2.1 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 Auxiliary Systems. Programs are described in Appendix B. Further details are provided in the system tables.

3.3.2.1.1 Area Ventilation System—Control Area

Materials

Control Area Ventilation System components are constructed of the following materials.

- Aluminum
- Cast austenitic stainless steel
- Copper alloy <15% Zn
- Copper alloy >15% Zn
- Elastomers
- Gray cast iron
- Polymer
- Stainless steel
- Steel

Environment

Control Area Ventilation System components are exposed to the following environments.

- Air - indoor uncontrolled
- Air with borated water leakage
- Closed cycle cooling water
- Condensation
- Dried air
- Gas
- Raw water

Aging Effects Requiring Management

The following aging effects associated with the Control Area Ventilation System require management.

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

Aging Management Programs

The following aging management programs manage the aging effects for the Control Area Ventilation System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Open-Cycle Cooling Water System (Section B.2.32)
- Selective Leaching of Materials Inspection (Section B.2.36)

3.3.2.1.2 Area Ventilation System—Plant Areas

Materials

Plant Area Ventilation System components are constructed of the following materials.

- Copper alloy <15% Zn
- Copper alloy >15% Zn
- Elastomers
- Gray cast iron
- Stainless steel
- Steel

Environment

Plant Area Ventilation System components are exposed to the following environments.

- Air - indoor uncontrolled
- Air - outdoor
- Air with borated water leakage
- Closed cycle cooling water
- Condensation
- Gas
- Raw water

Aging Effects Requiring Management

The following aging effects associated with the Plant Area Ventilation System require management.

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

Aging Management Programs

The following aging management programs manage the aging effects for the Plant Area Ventilation System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Open-Cycle Cooling Water System (Section B.2.32)
- Selective Leaching of Materials Inspection (Section B.2.36)

3.3.2.1.3 Boron Recovery and Primary Grade Water System

Materials

Boron Recovery and Primary Grade Water System components are constructed of the following materials.

- Cast austenitic stainless steel
- Copper alloy <15% Zn
- Copper alloy >15% Zn
- Glass
- Nickel alloy
- Stainless steel
- Steel

Environment

Boron Recovery and Primary Grade Water System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air with borated water leakage
- Closed cycle cooling water
- Condensation
- Gas
- Raw water
- Treated borated water
- Treated borated water >60°C (>140°F)
- Treated water
- Treated water >60°C (>140°F)

Aging Effects Requiring Management

The following aging effects associated with the Boron Recovery and Primary Grade Water System require management.

- Cracking
- Loss of material

Aging Management Programs

The following aging management programs manage the effects of aging on Boron Recovery and Primary Grade Water System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Flow-Accelerated Corrosion (Section B.2.18)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- One-Time Inspection (Section B.2.30)
- Selective Leaching of Materials Inspection (Section B.2.36)
- Water Chemistry (Section B.2.42)

3.3.2.1.4 Building and Yard Drains System

Materials

Building and Yard Drains System components are constructed of the following materials.

- Copper alloy >15% Zn
- Glass
- Gray cast Iron
- Stainless steel
- Steel

Environment

Building and Yard Drains System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air with borated water leakage
- Condensation
- Raw water

Aging Effects Requiring Management

The following aging effect associated with the Building and Yard Drains System requires management.

- Loss of material

Aging Management Programs

The following aging management programs manage the effects of aging on Building and Yard Drains System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Selective Leaching of Materials Inspection (Section B.2.36)

3.3.2.1.5 Chemical and Volume Control System

Materials

Chemical and Volume Control System components are constructed of the following materials.

- Cast austenitic stainless steel
- Copper alloy <15% Zn
- Copper alloy >15% Zn
- Elastomers
- Glass
- Gray cast iron
- Nickel alloy
- Stainless steel
- Steel

Environment

Chemical and Volume Control System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air with borated water leakage
- Closed cycle cooling water
- Closed cycle cooling water >60°C (>140°F)
- Condensation
- Gas
- Lubricating Oil
- Raw water
- Treated borated water
- Treated borated water >60°C (>140°F)
- Treated borated water >250°C (>482°F)
- Treated water
- Treated water >60°C (>140°F)

Aging Effects Requiring Management

The following aging effects associated with the Chemical and Volume Control System require management.

- Cracking
- Cumulative fatigue damage
- Hardening and loss of strength
- Loss of fracture toughness
- Loss of material
- Reduction of heat transfer

Aging Management Programs

The following aging management programs manage the effects of aging on Chemical and Volume Control System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)

- Flow-Accelerated Corrosion (Section B.2.18)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Lubricating Oil Analysis (Section B.2.24)
- One-Time Inspection (Section B.2.30)
- Open-Cycle Cooling Water System (Section B.2.32)
- Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) (Section B.2.41)
- Water Chemistry (Section B.2.42)

3.3.2.1.6 Chilled Water System

Materials

Chilled Water System components are constructed of the following materials.

- Cast austenitic stainless steel
- Copper alloy >15% Zn
- Glass
- Gray cast iron
- High strength steel
- Stainless steel
- Steel

Environment

Chilled Water System components are exposed to the following environments.

- Air - indoor uncontrolled
- Air with borated water leakage
- Air with steam or water leakage
- Closed cycle cooling water
- Condensation

Aging Effects Requiring Management

The following aging effects associated with Chilled Water System components require management.

- Cracking
- Loss of material

Aging Management Programs

The following aging management programs manage the effects of aging on Chilled Water System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Selective Leaching of Materials Inspection (Section B.2.36)

3.3.2.1.7 Compressed Air System

Materials

Compressed Air System components are constructed of the following materials.

- Aluminum
- Cast austenitic stainless steel
- Copper alloy <15% Zn
- Copper alloy >15% Zn
- Elastomers
- Glass
- Stainless steel
- Steel

Environment

Compressed Air System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air with borated water leakage
- Closed cycle cooling water
- Condensation
- Diesel exhaust
- Dried air
- Fuel oil
- Lubricating oil
- Raw water
- Treated water

Aging Effects Requiring Management

The following aging effects associated with the Compressed Air System require management.

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

Aging Management Programs

The following aging management programs manage the effects of aging on Compressed Air System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Fuel Oil Chemistry (Section B.2.20)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Lubricating Oil Analysis (Section B.2.24)
- One-Time Inspection (Section B.2.30)

- Selective Leaching of Materials Inspection (Section B.2.36)
- Water Chemistry (Section B.2.42)

3.3.2.1.8 Containment System

Materials

Containment System components are constructed of the following materials.

- Cast austenitic stainless steel
- Copper alloy <15% Zn
- Copper alloy >15% Zn
- Glass
- Stainless steel
- Steel

Environment

Containment System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air-outdoor
- Air with borated water leakage
- Dried air
- Lubricating oil

Aging Effects Requiring Management

The following aging effect associated with the Containment System requires management.

- Loss of material

Aging Management Programs

The following aging management programs manage the effects of aging on Containment System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)

- External Surfaces Monitoring (Section B.2.15)
- *Inspection of Internal Surfaces in Miscellaneous Piping and* Ducting Components (Section B.2.22)
- Lubricating Oil Analysis (Section B.2.24)
- One-Time Inspection (Section B.2.30)

3.3.2.1.9 Containment Vacuum and Leak Monitoring System

Materials

Containment Vacuum and Leak Monitoring System components are constructed of the following materials.

- Cast austenitic stainless steel
- Copper alloy <15% Zn
- Gray cast iron
- Nickel alloy
- Stainless steel
- Steel

Environment

Containment Vacuum and Leak Monitoring System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air with borated water leakage
- Condensation
- Treated water

Aging Effects Requiring Management

The following aging effect associated with the Containment Vacuum and Leak Monitoring System requires management.

- Loss of material

Aging Management Programs

The following aging management programs manage the effects of aging on Containment Vacuum and Leak Monitoring System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- One-Time Inspection (Section B.2.30)
- Selective Leaching of Materials Inspection (Section B.2.36)
- Water Chemistry (Section B.2.42)

3.3.2.1.10 Domestic Water System

Materials

Domestic Water System components are constructed of the following materials.

- Copper alloy <15% Zn
- Copper alloy >15% Zn
- Stainless steel
- Steel

Environment

Domestic Water System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air with borated water leakage
- Condensation
- Raw water

Aging Effects Requiring Management

The following aging effect associated with the Domestic Water System requires management.

- Loss of material

Aging Management Programs

The following aging management programs manage the effects of aging on Domestic Water System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Selective Leaching of Materials Inspection (Section B.2.36)

3.3.2.1.11 Emergency Diesel Generators and Air Intake and Exhaust System

Materials

Emergency Diesel Generators and Air Intake and Exhaust System components are constructed of the following materials.

- Aluminum
- Copper alloy <15% Zn
- Copper alloy >15% Zn
- Elastomers
- Stainless steel
- Steel

Environment

Emergency Diesel Generators and Air Intake and Exhaust System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air-outdoor
- Closed cycle cooling water
- Condensation
- Diesel exhaust

Aging Effects Requiring Management

The following aging effects associated with the Emergency Diesel Generators and Air Intake and Exhaust System require management.

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

Aging Management Programs

The following aging management programs manage the effects of aging on Emergency Diesel Generators and Air Intake and Exhaust System components.

- Bolting Integrity (Section B.2.6)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Selective Leaching of Materials Inspection (Section B.2.36)

3.3.2.1.12 Emergency Diesel Generators—Air Start System

Materials

Emergency Diesel Generator Air Start System components are constructed of the following materials.

- Aluminum
- Copper alloy >15% Zn
- Copper alloy <15% Zn
- Elastomers
- Polymer
- Stainless steel
- Steel

Environment

Emergency Diesel Generator Air Start System components are exposed to the following environments.

- Air-indoor uncontrolled
- Condensation
- Dried air

Aging Effects Requiring Management

The following aging effects associated with the Emergency Diesel Generator Air Start System require management.

- Cracking
- Cumulative fatigue damage
- Hardening and loss of strength
- Loss of material

Aging Management Programs

The following aging management programs manage the effects of aging on Emergency Diesel Generator Air Start System components.

- Bolting Integrity (Section B.2.6)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Selective Leaching of Materials Inspection (Section B.2.36)

3.3.2.1.13 Emergency Diesel Generators—Crankcase Vacuum System

Materials

Emergency Diesel Generator Crankcase Vacuum System components are constructed of the following materials.

- Copper alloy <15% Zn
- Elastomers
- Stainless steel
- Steel

Environment

Emergency Diesel Generator Crankcase Vacuum System components are exposed to the following environments.

- Air-indoor uncontrolled
- Condensation
- Lubricating oil

Aging Effects Requiring Management

The following aging effects associated with the Emergency Diesel Generator Crankcase Vacuum System require management.

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

Aging Management Programs

The following aging management programs manage the effects of aging on Emergency Diesel Generator Crankcase Vacuum System components.

- Bolting Integrity (Section B.2.6)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Lubricating Oil Analysis (Section B.2.24)
- One-Time Inspection (Section B.2.30)

3.3.2.1.14 Emergency Diesel Generators—Fuel Oil System

Materials

Emergency Diesel Generator Fuel Oil System components are constructed of the following materials.

- Cast austenitic stainless steel
- Copper alloy <15% Zn
- Copper alloy >15% Zn

- Elastomers
- Glass
- Gray cast iron
- Stainless steel
- Steel

Environment

Emergency Diesel Generator Fuel Oil System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air-outdoor
- Concrete
- Fuel oil
- Soil

Aging Effects Requiring Management

The following aging effects associated with the Emergency Diesel Generator Fuel Oil System require management.

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

Aging Management Programs

The following aging management programs manage the effects of aging on Emergency Diesel Generator Fuel Oil System components.

- Bolting Integrity (Section B.2.6)
- Buried Piping and Tanks Inspection (Section B.2.8)
- External Surfaces Monitoring (Section B.2.15)
- Fuel Oil Chemistry (Section B.2.20)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- One-Time Inspection (Section B.2.30)

3.3.2.1.15 Emergency Diesel Generators—Lube Oil System

Materials

Emergency Diesel Generator Lube Oil System components are constructed of the following materials.

- Aluminum
- Copper alloy >15% Zn
- Elastomers
- Glass
- Stainless steel
- Steel

Environment

Emergency Diesel Generator Lube Oil System components are exposed to the following environments.

- Air-indoor uncontrolled
- Closed cycle cooling water
- Lubricating oil

Aging Effects Requiring Management

The following aging effects associated with the Emergency Diesel Generator Lube Oil System require management.

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

Aging Management Programs

The following aging management programs manage the effects of aging on Emergency Diesel Generator Lube Oil System components.

- Bolting Integrity (Section B.2.6)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)

- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Lubricating Oil Analysis (Section B.2.24)
- One-Time Inspection (Section B.2.30)
- Selective Leaching of Materials Inspection (Section B.2.36)

3.3.2.1.16 Emergency Diesel Generators—Water Cooling System

Materials

Emergency Diesel Generator Water Cooling System components are constructed of the following materials.

- Cast austenitic stainless steel
- Copper alloy <15% Zn
- Copper alloy >15% Zn
- Elastomers
- Gray cast iron
- Polymer
- Stainless steel
- Steel

Environment

Emergency Diesel Generator Water Cooling System components are exposed to the following environments.

- Air-indoor uncontrolled
- Closed cycle cooling water
- Closed cycle cooling water >60°C (>140°F)
- Lubricating oil
- Raw water

Aging Effects Requiring Management

The following aging effects associated with the Emergency Diesel Generator Water Cooling System require management.

- Cracking

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

Aging Management Programs

The following aging management programs manage the effects of aging on Emergency Diesel Generator Water Cooling System components.

- Bolting Integrity (Section B.2.6)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Lubricating Oil Analysis (Section B.2.24)
- One-Time Inspection (Section B.2.30)
- Open-Cycle Cooling Water System (Section B.2.32)
- Selective Leaching of Materials Inspection (Section B.2.36)

3.3.2.1.17 Emergency Response Facility Substation System (Common)

Materials

Emergency Response Facility Substation System components are constructed of the following materials.

- Aluminum
- Copper alloy >15% Zn
- Elastomers
- Glass
- Gray cast iron
- Polymer
- Stainless steel
- Steel

Environment

Emergency Response Facility Substation System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air-outdoor
- Closed cycle cooling water
- Closed cycle cooling water >60°C (>140°F)
- Diesel exhaust
- Fuel oil
- Lubricating oil
- Soil

Aging Effects Requiring Management

The following aging effects associated with the Emergency Response Facility Substation System require management.

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

Aging Management Programs

The following aging management programs manage the effects of aging on Emergency Response Facility Substation System components.

- Bolting Integrity (Section B.2.6)
- Buried Piping and Tanks Inspection (Section B.2.8)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Fuel Oil Chemistry (Section B.2.20)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Lubricating Oil Analysis (Section B.2.24)
- One-Time Inspection (Section B.2.30)
- Selective Leaching of Materials Inspection (Section B.2.36)

3.3.2.1.18 Fire Protection System

Materials

Fire Protection System components are constructed of the following materials.

- Aluminum
- Cast austenitic stainless steel
- Copper alloy <15% Zn
- Copper alloy >15% Zn
- Galvanized steel
- Glass
- Gray cast iron
- Polymer
- Stainless steel
- Steel

Environment

Fire Protection System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air-outdoor
- Air with borated water leakage
- Closed cycle cooling water
- Condensation
- Diesel exhaust
- Dried air
- Fuel Oil
- Gas
- Lubricating Oil
- Raw Water
- Soil

Aging Effects Requiring Management

The following aging effects associated with the Fire Protection System require management.

- Cracking

- Cumulative fatigue damage
- Loss of material
- Reduction of heat transfer

Aging Management Programs

The following aging management programs manage the effects of aging on Fire Protection System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Buried Piping and Tanks Inspection (Section B.2.8)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Fire Protection (Section B.2.16)
- Fire Water System (Section B.2.17)
- Fuel Oil Chemistry (Section B.2.20)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Lubricating Oil Analysis (Section B.2.24)
- One-Time Inspection (Section B.2.30)
- Selective Leaching of Materials Inspection (Section B.2.36)

3.3.2.1.19 Fuel Pool Cooling and Purification System

Materials

Fuel Pool Cooling and Purification System components are constructed of the following materials.

- Cast austenitic stainless steel
- Nickel alloy
- Stainless steel
- Steel

Environment

Fuel Pool Cooling and Purification System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air with borated water leakage
- Closed cycle cooling water
- Condensation
- Treated borated water

Aging Effects Requiring Management

The following aging effects associated with the Fuel Pool Cooling and Purification System require management.

- Loss of material
- Reduction of heat transfer

Aging Management Programs

The following aging management programs manage the effects of aging on Fuel Pool Cooling and Purification System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- One-Time Inspection (Section B.2.30)
- Water Chemistry (Section B.2.42)

3.3.2.1.20 Gaseous Waste Disposal System

Materials

Gaseous Waste Disposal System components are constructed of the following materials.

- Glass
- Stainless steel
- Steel

Environment

Gaseous Waste Disposal System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air with borated water leakage
- Closed cycle cooling water
- Condensation
- Gas

Aging Effects Requiring Management

The following aging effect associated with the Gaseous Waste Disposal System requires management.

- Loss of material

Aging Management Programs

The following aging management programs manage the effects of aging on Gaseous Waste Disposal System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)

3.3.2.1.21 Liquid Waste Disposal System

Materials

Liquid Waste Disposal System components are constructed of the following materials.

- Copper alloy >15% Zn
- Nickel alloy
- Stainless steel
- Steel

Environment

Liquid Waste Disposal System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air with borated water leakage
- Closed-cycle cooling water
- Raw water
- Treated water

Aging Effects Requiring Management

The following aging effect associated with the Liquid Waste Disposal System requires management.

- Loss of material

Aging Management Programs

The following aging management programs manage the effects of aging on Liquid Waste Disposal System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- One-Time Inspection (Section B.2.30)

- Selective Leaching of Materials Inspection (Section B.2.36)
- Water Chemistry (Section B.2.42)

3.3.2.1.22 Post-Accident Sample System

Materials

Post-Accident Sample System components are constructed of the following materials.

- Stainless steel
- Steel

Environment

Post-Accident Sample System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air with borated water leakage
- Closed cycle cooling water
- Condensation
- Raw water
- Treated borated water
- Treated water

Aging Effects Requiring Management

The following aging effect associated with the Post-Accident Sample System requires management.

- Loss of material

Aging Management Programs

The following aging management programs manage the effects of aging on Post-Accident Sample System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)

- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- One-Time Inspection (Section B.2.30)
- Open-Cycle Cooling Water System (Section B.2.32)
- Water Chemistry (Section B.2.42)

3.3.2.1.23 Post-Design Basis Accident Hydrogen Control System

Materials

Post-Design Basis Accident Hydrogen Control System components are constructed of the following materials.

- Aluminum
- Cast austenitic stainless steel
- Gray cast iron
- Stainless steel
- Steel

Environment

Post-Design Basis Accident Hydrogen Control System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air-outdoor
- Air with borated water leakage
- Gas

Aging Effects Requiring Management

The following aging effect associated with the Post-Design Basis Accident Hydrogen Control System requires management.

- Loss of material

Aging Management Programs

The following aging management programs manage the effects of aging on Post-Design Basis Accident Hydrogen Control System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)

3.3.2.1.24 Primary Component and Neutron Shield Tank Cooling Water System

Materials

Primary Component and Neutron Shield Tank Cooling Water System components are constructed of the following materials.

- Cast austenitic stainless steel
- Copper alloy <15 % Zn
- Copper alloy >15% Zn
- Glass
- Gray cast iron
- Nickel alloy
- Stainless steel
- Steel
- Steel with stainless steel cladding

Environment

Primary Component and Neutron Shield Tank Cooling Water System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air with borated water leakage
- Closed cycle cooling water
- Condensation

- Lubricating oil
- Raw water

Aging Effects Requiring Management

The following aging effects associated with the Primary Component and Neutron Shield Tank Cooling Water System require management.

- Loss of material
- Reduction in Heat Transfer

Aging Management Programs

The following aging management programs manage the effects of aging on Primary Component and Neutron Shield Tank Cooling Water System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Lubricating Oil Analysis (Section B.2.24)
- One-Time Inspection (Section B.2.30)
- Open-Cycle Cooling Water System (Section B.2.32)
- Selective Leaching of Materials Inspection (Section B.2.36)

3.3.2.1.25 Radiation Monitoring System

Materials

Radiation Monitoring System components are constructed of the following materials.

- Copper alloy <15% Zn
- Stainless steel
- Steel

Environment

Radiation Monitoring System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air-outdoor
- Air with borated water leakage
- Closed cycle cooling water
- Raw water
- Treated borated water
- Treated water
- Treated water >60°C (>140°F)

Aging Effects Requiring Management

The following aging effects associated with the Radiation Monitoring System require management.

- Cracking
- Loss of material
- Reduction in heat transfer

Aging Management Programs

The following aging management programs manage the effects of aging on Radiation Monitoring System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)
- One-Time Inspection (Section B.2.30)
- Open-Cycle Cooling Water System (Section B.2.32)
- Water Chemistry (Section B.2.42)

3.3.2.1.26 Reactor Plant Sample System

Materials

Reactor Plant Sample System components are constructed of the following materials.

- Cast austenitic stainless steel
- Copper alloy >15% Zn
- Glass
- Gray cast iron
- Nickel Alloy
- Polymer
- Stainless steel
- Steel

Environment

Reactor Plant Sample System components are exposed to the following environments.

- Air-Indoor uncontrolled
- Air with borated water leakage
- Closed cycle cooling water
- Condensation
- Gas
- Treated borated water
- Treated borated water >60°C (>140°F)
- Treated borated water >250°C (>482°F)
- Treated water
- Treated water >60°C (>140°F)

Aging Effects Requiring Management

The following aging effects associated with the Reactor Plant Sample System require management.

- Cracking
- Cumulative fatigue damage

- Loss of material
- Loss of fracture toughness

Aging Management Programs

The following aging management programs manage the effects of aging on Reactor Plant Sample System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- One-Time Inspection (Section B.2.30)
- Selective Leaching of Materials Inspection (Section B.2.36)
- Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) (Section B.2.41)
- Water Chemistry (Section B.2.42)

3.3.2.1.27 Reactor Plant Vents and Drains

Materials

Reactor Plant Vents and Drains components are constructed of the following materials.

- Cast austenitic stainless steel
- Gray cast iron
- Nickel alloy
- Stainless steel
- Steel

Environment

Reactor Plant Vents and Drains components are exposed to the following environments.

- Air-indoor uncontrolled

- Air with borated water leakage
- Closed-cycle cooling water
- Concrete
- Condensation
- Gas
- Raw water
- Treated borated water
- Treated borated water >60°C (>140°F)

Aging Effects Requiring Management

The following aging effects associated with the Reactor Plant Vents and Drains require management.

- Cracking
- Cumulative fatigue damage
- Loss of material

Aging Management Programs

The following aging management programs manage the effects of aging on Reactor Plant Vents and Drains components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- One-Time Inspection (Section B.2.30)
- Selective Leaching of Materials Inspection (Section B.2.36)
- Water Chemistry (Section B.2.42)

3.3.2.1.28 River Water System (Unit 1 only)

Materials

River Water System components are constructed of the following materials.

- Cast austenitic stainless steel
- Copper alloy >15% Zn
- Glass
- Gray cast iron
- Stainless steel
- Steel

Environment

River Water System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air-outdoor
- Air with borated water leakage
- Condensation
- Gas
- Raw water
- Soil
- Treated borated water

Aging Effects Requiring Management

The following aging effect associated with the River Water System requires management.

- Loss of material

Aging Management Programs

The following aging management programs manage the effects of aging on River Water System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Buried Piping and Tanks Inspection (Section B.2.8)
- External Surfaces Monitoring (Section B.2.15)

- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Open-Cycle Cooling Water System (Section B.2.32)
- Selective Leaching of Materials Inspection (Section B.2.36)
- Water Chemistry (Section B.2.42)

3.3.2.1.29 Security Diesel Generator System (Common)

Materials

Security Diesel Generator System components are constructed of the following materials.

- Aluminum
- Copper alloy >15% Zn
- Elastomers
- Gray cast iron
- Polymer
- Stainless steel
- Steel

Environment

Security Diesel Generator System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air-outdoor
- Closed cycle cooling water
- Diesel exhaust
- Fuel oil
- Lubricating oil
- Soil

Aging Effects Requiring Management

The following aging effects associated with the Security Diesel Generator System require management.

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

Aging Management Programs

The following aging management programs manage the effects of aging on Security Diesel Generator System components.

- Bolting Integrity (Section B.2.6)
- Buried Piping and Tanks Inspection (Section B.2.8)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Fuel Oil Chemistry (Section B.2.20)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Lubricating Oil Analysis (Section B.2.24)
- One-Time Inspection (Section B.2.30)
- Selective Leaching of Materials Inspection (Section B.2.36)

3.3.2.1.30 Service Water System (Unit 2 only)

Materials

Service Water System components are constructed of the following materials.

- Cast austenitic stainless steel
- Glass
- Gray cast iron
- Nickel alloy
- Stainless steel
- Steel

Environment

Service Water System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air-outdoor
- Air with borated water leakage
- Closed cycle cooling water
- Condensation
- Raw water
- Soil
- Treated borated water

Aging Effects Requiring Management

The following aging effect associated with the Service Water System requires management.

- Loss of material

Aging Management Programs

The following aging management programs manage the effects of aging on Service Water System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- Buried Piping and Tanks Inspection (Section B.2.8)
- Closed-Cycle Cooling Water System (Section B.2.9)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- Open-Cycle Cooling Water System (Section B.2.32)
- Selective Leaching of Materials Inspection (Section B.2.36)
- Water Chemistry (Section B.2.42)

3.3.2.1.31 Solid Waste Disposal System

Materials

Solid Waste Disposal System components are constructed of the following materials.

- Cast austenitic stainless steel
- Elastomers
- Glass
- Gray cast iron
- Polymer
- Stainless steel
- Steel

Environment

Solid Waste Disposal System components are exposed to the following environments.

- Air-indoor uncontrolled
- Air with borated water leakage
- Raw water
- Treated water

Aging Effects Requiring Management

The following aging effects associated with the Solid Waste Disposal System require management.

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

Aging Management Programs

The following aging management programs manage the effects of aging on Solid Waste Disposal System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- External Surfaces Monitoring (Section B.2.15)

- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)
- One-Time Inspection (Section B.2.30)
- Selective Leaching of Materials Inspection (Section B.2.36)
- Water Chemistry (Section B.2.42)

3.3.2.1.32 Supplementary Leak Collection and Release System

Materials

Supplementary Leak Collection and Release System components are constructed of the following materials.

- Aluminum
- Cast austenitic stainless steel
- Copper alloy >15% Zn
- Elastomers
- Stainless steel
- Steel

Environment

Supplementary Leak Collection and Release System components are exposed to the following environments.

- Air - indoor uncontrolled
- Air - outdoor
- Air with borated water leakage
- Condensation
- Dried air
- Raw water

Aging Effects Requiring Management

The following aging effects associated with the Supplementary Leak Collection and Release System require management.

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

Aging Management Programs

The following aging management programs manage the effects of aging on Supplementary Leak Collection and Release System components.

- Bolting Integrity (Section B.2.6)
- Boric Acid Corrosion (Section B.2.7)
- External Surfaces Monitoring (Section B.2.15)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.22)

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. Section 3.3.2.2 of NUREG-1800 [Reference 1.3-4] discusses these aging effects and other issues that require further evaluation. The following sections are numbered in accordance with the discussions in NUREG-1800 and explain the BVPS approach to these areas requiring further evaluation. Programs are described in Appendix B.

3.3.2.2.1 Cumulative Fatigue Damage

Fatigue is a TLAA as defined in 10 CFR 54.3 [Reference 1.3-3]. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). The evaluation of metal fatigue is addressed separately in Section 4.3.

3.3.2.2.2 Reduction of Heat Transfer Due to Fouling

Reduction of heat transfer due to fouling could occur for stainless steel heat exchanger tubes exposed to treated water. NUREG-1800 and NUREG-1801 incorrectly identify this item as applicable to BWR and PWR nuclear power plants. However, unique items VII.A4-4 (AP-62) and VII.E3-6 (AP-62) apply to BWR plants only.

3.3.2.2.3 Cracking Due to Stress Corrosion Cracking (SCC)

3.3.2.2.3.1 SCC of BWR Standby Liquid Control System Components

Cracking of BWR Standby Liquid Control piping components is applicable to BWR plants only.

3.3.2.2.3.2 SCC of Heat Exchanger Components

Cracking due to stress corrosion cracking of stainless steel and stainless steel clad steel heat exchanger components exposed to treated water greater than 60°C (140°F) is an aging effect for BWR plants that can also be applicable to BVPS stainless steel heat exchanger tube and tube sheet components in the Boron Recovery and Primary Grade Water System.

BVPS manages this aging effect by a combination of the Water Chemistry Program (Section B.2.42) and One-Time Inspection Program (Section B.2.30). The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the prevention or mitigation of the cracking and loss of material aging effects. The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation.

3.3.2.2.3.3 SCC of Stainless Steel Diesel Exhaust Piping

Cracking due to SCC could occur in stainless steel diesel engine exhaust piping, piping components, and piping elements exposed to diesel exhaust.

BVPS manages cracking due to SCC of these components by the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program (Section B.2.22). The program includes visual inspections to assure that existing environmental conditions are not causing material degradation that could result in a loss of component intended functions.

3.3.2.2.4 Cracking Due to Stress Corrosion Cracking and Cyclic Loading

3.3.2.2.4.1 Cracking of PWR Non-Regenerative Heat Exchanger Components

Cracking due to SCC and cyclic loading could occur in stainless steel non-regenerative heat exchanger components exposed to treated borated water greater than 60°C (140°F) in the CVCS.

BVPS manages cracking of CVCS heat exchanger components with a combination of the Water Chemistry Program (Section B.2.42) and the One-Time Inspection Program (Section B.2.30). The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the prevention or mitigation of the cracking and loss of material aging effects. The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation. The One-Time Inspection Program is selected in lieu of eddy current testing of tubes. Radioactivity and temperature monitoring of the shell side water is provided by installed instrumentation.

This position was found acceptable to the NRC staff in NUREG-1785, *Safety Evaluation Report Related to the License Renewal of H. B. Robinson Steam Electric Plant, Unit 2 (RNP)* [Reference 3.0-3].

3.3.2.2.4.2 Cracking of PWR Regenerative Heat Exchanger Components

Cracking due to SCC and cyclic loading could occur in stainless steel regenerative heat exchanger components exposed to treated borated water greater than 60°C (140°F).

BVPS manages cracking of CVCS heat exchanger components with a combination of the Water Chemistry Program (Section B.2.42) and the One-Time Inspection Program (Section B.2.30). The basis for acceptability of the aging management approach is identical to that in Section 3.3.2.2.4.1.

3.3.2.2.4.3 Cracking of PWR Pumps in the Chemical and Volume Control System

Cracking due to SCC and cyclic loading could occur for the stainless steel pump casing for the PWR high-pressure pumps in the CVCS. However, cracking of high pressure pump casings in the CVCS is not applicable to BVPS because the pump temperature is below 60°C (140°F), which is the threshold required to support cracking.

3.3.2.2.4.4 Cracking of High Strength Bolting Exposed to Steam or Water Leakage

Cracking of high strength closure bolting could occur for bolting exposed to steam or water leakage. Although there have been industry instances of cracking of carbon steel and low-alloy steel bolting due to SCC, these failures have been attributed to high yield strength materials (>150 ksi), leaking gaskets, and exposure to contaminants such as lubricants containing molybdenum disulfide. BVPS selects proper bolting material in conjunction with the proper selection of lubricants and, through control of bolt torque, has been effective in eliminating SCC of bolting. Industry data and plant-specific operating experience support this conclusion. High strength bolts are used in a very small number of closure bolting applications, and are not re-used after removal.

3.3.2.2.5 Hardening and Loss of Strength Due to Elastomer Degradation

3.3.2.2.5.1 Degradation of Elastomer Seals and Components in HVAC Systems

Hardening and loss of strength due to elastomer degradation could occur in seals and components of HVAC systems exposed to indoor air on internal or external surfaces.

BVPS manages the internal and external surfaces of elastomer components such as flexible collars in ventilation systems with the External Surfaces Monitoring Program (Section B.2.15). The External Surfaces Monitoring Program is based on system inspections and walkdowns. This program consists of periodic visual inspections of components within the scope of license renewal and subject to AMR in order to manage aging effects. The program manages aging effects through visual inspection of external surfaces for evidence of material degradation (i.e., hardening, loss of strength, cracking) that could result in a loss of component intended functions. This external monitoring program is also capable of managing the internal aging effects for elastomers, since the same environments exist at both surfaces, the effects will be observable externally, and observation of the surface during physical manipulation to visually confirm flexibility will reveal both cracking and hardening/loss of strength.

3.3.2.2.5.2 Degradation of Elastomer Linings of Components in Spent Fuel Pool Cooling and Cleanup Systems

For PWRs, unique item VII.A3-1 (A-15) may be relevant. This unique item evaluates Spent Fuel Pool Cooling and Cleanup components with elastomer lining. However, BVPS Fuel Pool Cooling and Purification System components do not have elastomer lining. Therefore, this item is not applicable.

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

Loss of material due to general corrosion could occur in the neutron-absorbing materials used in spent fuel storage racks exposed to treated water or treated borated water.

Unit 1 has Boral neutron-absorbing sheets in Spent Fuel Pool storage racks, but no Boraflex sheets. Unit 2 has Boraflex neutron-absorbing sheets in Spent Fuel Pool storage racks, but no Boral sheets.

The AMR evaluation reviewed the current industry and plant specific operating experience for Boral and determined that negligible adverse operating experience has been recorded.

The NRC concluded [Reference 3.0-4] that degradation of neutron absorption performance has not been observed in materials other than Boraflex for any operating reactors in the United States. BVPS does not credit Boraflex for neutron absorption. Potential aging effects resulting from sustained irradiation of Boral were previously evaluated by the NRC [Reference 3.0-5, et.al.] and determined to be insignificant.

Therefore, it is concluded that "reduction of neutron-absorbing capacity" for Boral does not require aging management for BVPS. However, the aging effect of loss of material will be managed by the Water Chemistry Program (Section B.2.42). The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the prevention or mitigation of the cracking and loss of material aging effects.

3.3.2.2.7 Loss of Material Due to General, Pitting, and Crevice Corrosion

3.3.2.2.7.1 Reactor Coolant Pump Oil Leakage Collection System

Loss of material due to general, pitting, and crevice corrosion could occur in steel components of the reactor coolant pump lube oil leakage collection system exposed to lubricating oil (as part of the Fire Protection System). Affected components may include piping, tubing, valves, and tanks.

BVPS manages piping components exposed to lubricating oil with a combination of the Lubricating Oil Analysis Program (Section B.2.24) and the One-Time Inspection Program (Section B.2.30). The Lubricating Oil Analysis Program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to loss of material, cracking or reduction of heat transfer. The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation. The One-Time Inspection Program includes an inspection to determine the thickness of the lower portion of the reactor coolant pump oil collection tank.

3.3.2.2.7.2 BWR Reactor Water Cleanup and Shutdown Cooling Systems

Loss of material due to general, pitting, and crevice corrosion could occur in steel piping, piping components, and piping elements in the BWR reactor water cleanup and shutdown cooling systems exposed to treated water. This item, applicable to BWR plants, is also appropriate for some treated (unborated water) systems in PWRs with the same material, environment, and aging effects. This item includes steel and gray cast iron exposed to treated water in several Auxiliary Systems.

BVPS manages the aging effects with a combination of the Water Chemistry Program (Section B.2.42) and the One-Time Inspection Program (Section B.2.30). The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the prevention or mitigation of the loss of material aging effect. The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation.

3.3.2.2.7.3 Diesel Engine Exhaust System Piping

Loss of material due to general (steel only), pitting, and crevice corrosion could occur in steel and stainless steel diesel exhaust piping, piping components, and piping elements exposed to diesel exhaust.

BVPS manages the internal surfaces of piping components exposed to diesel exhaust with the Inspection of Internal Surfaces in Miscellaneous Piping and

Ducting Components Program (Section B.2.22). These internal inspections are performed during the periodic system and component surveillances or during the performance of maintenance activities when the surfaces are made accessible for visual inspection.

The program includes visual inspections to assure that existing environmental conditions are not causing material degradation that could result in a loss of component intended functions.

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 could occur for steel piping, piping components, and piping elements, buried in soil regardless of the presence of pipe coatings or wrappings.

BVPS manages the external surfaces of piping components exposed to soil with the Buried Piping and Tanks Inspection Program (Section B.2.8). The program includes preventive measures to mitigate corrosion (e.g., coatings and wrappings required by design), and inspections to manage the effects of corrosion on the pressure-retaining capability of buried steel and stainless steel components. Preventive measures are in accordance with standard industry practice for maintaining external coatings and wrappings. Buried components will be inspected when excavated during maintenance or a planned inspection.

3.3.2.2.9 Loss of Material Due to General, Pitting, Crevice, MIC, and Fouling

3.3.2.2.9.1 Steel Components Exposed to Fuel Oil

Loss of material due to general, pitting, crevice, MIC, and fouling could occur for steel piping, piping components, and piping elements, and tanks exposed to fuel oil.

BVPS manages piping components and tanks exposed to fuel oil with a combination of the Fuel Oil Chemistry Program (Section B.2.20) and the One-Time Inspection Program (Section B.2.30). The Fuel Oil Chemistry Program maintains fuel oil quality by monitoring and controlling fuel oil contamination in accordance with the plant's Technical Specifications and the guidelines of the American Society for Testing Materials. Exposure to fuel oil contaminants, such as water and microbiological organisms, is minimized by periodic draining or cleaning of tanks and by verifying the quality of new oil before introduction into the storage tanks.

The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation. The One-Time Inspection Program manages tank bottom surfaces for the following tanks:

- EDG fuel oil storage tanks;
- EDG fuel oil day tanks;
- Security diesel generator fuel oil tanks;
- ERF diesel generator fuel oil day tank; and,
- Diesel-driven air compressor fuel oil tank (Unit 2 only).

Visual and/or ultrasonic inspection techniques will be used, as appropriate for the application, to confirm that unexpected aging effects are not occurring.

3.3.2.2.9.2 Steel Heat Exchanger Components Exposed to Lubricating Oil

Loss of material due to general, pitting, crevice, MIC, and fouling could occur for steel heat exchanger components exposed to lubricating oil.

BVPS manages piping components exposed to lubricating oil with a combination of the Lubricating Oil Analysis Program (Section B.2.24) and the One-Time Inspection Program (Section B.2.30). The Lubricating Oil Analysis Program maintains oil system contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to loss of material, cracking or reduction of heat transfer. The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation.

3.3.2.2.10 Loss of Material Due to Pitting and Crevice Corrosion

3.3.2.2.10.1 Elastomer-Lined and Stainless Steel Clad Components Exposed to Treated or Treated Borated Water

Loss of material due to pitting and crevice corrosion could occur in BWR and PWR steel piping with elastomer lining or stainless steel cladding that are exposed to treated water and treated borated water if the cladding or lining is degraded. For PWRs, unique item VII.A3-9 (A-39) is relevant. This unique item evaluates the spent fuel pool and water purification system steel components with elastomer lining or stainless steel cladding, only after the lining or cladding degradation.

BVPS Fuel Pool Cooling and Purification System components do not have elastomer linings or stainless steel cladding. Therefore, this item is not applicable.

3.3.2.2.10.2 Stainless Steel, Steel with Stainless Cladding, and Aluminum Components Exposed to Treated Water

Loss of material due to pitting and crevice corrosion could occur for stainless steel and aluminum piping, piping components, piping elements, and for stainless steel and steel with stainless steel cladding heat exchanger components exposed to treated water.

Loss of material for BWR Spent Fuel Pool Cooling and Cleanup, Reactor Water Cleanup, and Shutdown Cooling System piping components exposed to treated water is normally applicable to BWR plants only. Unique items VII.A4-11, VII.E3-15, VII.E4-14, VII.A4-5, VII.E3-7, and VII.E4-4 in NUREG-1801 apply only to BWR plants. However, this BWR item may be considered to be applicable to some PWR treated (unborated) water systems with the same material, and was used for comparison by BVPS because no corresponding NUREG-1801 row existed for PWRs. The aging effect is also applicable to nickel alloy in this environment.

For BVPS the aging effect of loss of material due to pitting and crevice corrosion is managed by a combination of the Water Chemistry Program (Section B.2.42) and the One-Time Inspection Program (Section B.2.30). The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the prevention or mitigation of the loss of material aging effect. The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation.

3.3.2.2.10.3 Copper Alloy HVAC Components Exposed to Condensation

Loss of material due to pitting and crevice corrosion could occur for copper alloy HVAC piping, piping components, and piping elements exposed to condensation (external).

For BVPS, the Bolting Integrity Program (Section B.2.6), the External Surfaces Monitoring Program (Section B.2.15), and the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program (Section B.2.22) will manage the aging effect of loss of material due to pitting and crevice corrosion in copper alloy components exposed to condensation through periodic visual inspections. In addition to the HVAC system, BVPS has aligned components in the Chilled Water, Fire Protection, Domestic Water and Sampling Systems to this item. The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program will manage loss of material in the copper alloy ventilation cooling tubes in the Chilled Water and HVAC components with an external environment of Condensation. The External Surfaces Monitoring Program will manage loss of material due to pitting and crevice corrosion for all copper alloy components with an external environment of condensation, except bolting. NUREG-1801 does not identify any bronze bolting materials, however the Bolting Integrity Program will manage loss of material for copper alloy bolting that is not caused by boric acid corrosion, including bolting with an external environment of condensation.

3.3.2.2.10.4 Copper Alloy HVAC Piping Components Exposed to Lubricating Oil

Loss of material due to pitting and crevice corrosion could occur for copper alloy piping, piping components, and piping elements exposed to lubricating oil.

BVPS manages piping components exposed to lubricating oil with the Lubricating Oil Analysis Program (Section B.2.24), and the One-Time Inspection Program (Section B.2.30). The Lubricating Oil Analysis Program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to loss of material, cracking or reduction of heat transfer. The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation.

3.3.2.2.10.5 Aluminum HVAC Components and Stainless Components Exposed to Condensation

Loss of material due to pitting and crevice corrosion could occur for HVAC aluminum piping, piping components, and piping elements and stainless steel ducting and components exposed to condensation.

BVPS uses one of the following programs to manage loss of material for these components: the Bolting Integrity Program (Section B.2.6), the External Surfaces Program (Section B.2.15), the Fire Protection Program (Section B.2.16), and the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program (Section B.2.22). These programs provide external or internal inspections that are performed during the periodic system and component surveillances or during the performance of maintenance activities when the surfaces are made accessible for visual inspection.

These inspections assure that existing environmental conditions are not causing material degradation that could result in a loss of component intended functions.

3.3.2.2.10.6 Copper Alloy Fire Protection Piping Components Exposed to Condensation

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.

BVPS has copper alloy components in a number of systems that are exposed internally to condensation, and are managed by the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program (Section B.2.22). The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program includes inspections of the internal surfaces of the piping and other components. These internal inspections are performed during the periodic system and component surveillances or during the performance of maintenance activities when the surfaces are made accessible for visual inspection. These inspections will assure that existing environmental conditions are not causing material degradation that could result in a loss of intended function.

3.3.2.2.10.7 Stainless Steel Piping Components Exposed to Soil

Loss of material due to pitting and crevice corrosion could occur for stainless steel piping, piping components, and piping elements exposed to soil.

The BVPS River Water (Unit 1 only) and Service Water (Unit 2 only) Systems contain stainless steel components exposed to soil. The aging effects are managed by the Buried Piping and Tanks Inspection Program (Section B.2.8). This program includes preventive measures to mitigate corrosion, and inspections to manage the effects of corrosion on the pressure-retaining capability of buried steel and stainless steel components. Preventive measures are in accordance with standard industry practice for maintaining external coatings and wrappings. Buried components will be inspected when excavated during maintenance or a planned inspection.

3.3.2.2.10.8 Corrosion of BWR Standby Liquid Control System Components

Loss of material for BWR Standby Liquid Control System piping components exposed to treated water and sodium pentaborate is applicable to BWR plants only.

3.3.2.2.11 Loss of Material Due to Pitting, Crevice, and Galvanic Corrosion

Loss of material due to pitting, crevice, and galvanic corrosion could occur for copper alloy piping, piping components, and piping elements exposed to treated water. This item is applicable to BWRs, however the aging comparison to this BWR item is appropriate for treated (unborated water) systems in PWRs when no comparable PWR item is available.

These aging effects are managed for the BVPS Compressed Air System by a combination of the Water Chemistry Program (Section B.2.42) and One-Time Inspection Program (Section B.2.30). The Water Chemistry Program provides for monitoring and controlling of water chemistry using site procedures and processes for the prevention or mitigation of the loss of material aging effect. The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation.

3.3.2.2.12 Loss of Material Due to Pitting, Crevice, and Microbiologically-Influenced Corrosion

3.3.2.2.12.1 Stainless Steel, Aluminum, and Copper Alloy Components Exposed to Fuel Oil

Loss of material due to pitting, crevice, and MIC could occur in stainless steel, aluminum, and copper alloy piping, piping components, and piping elements exposed to fuel oil.

BVPS manages these aging effects for piping components exposed to fuel oil with the Fuel Oil Chemistry Program (Section B.2.20) and the One-Time Inspection Program (Section B.2.30).

The Fuel Oil Chemistry Program maintains fuel oil quality by monitoring and controlling fuel oil contamination in accordance with the plant's Technical Specifications and the guidelines of the American Society for Testing Materials.

Exposure to fuel oil contaminants, such as water and microbiological organisms, is minimized by periodic draining or cleaning of tanks and by verifying the quality of new oil before its introduction into the storage tanks.

The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation.

3.3.2.2.12.2 Stainless Steel Piping Components Exposed to Lubricating Oil

Loss of material due to pitting, crevice, and MIC could occur in stainless steel, piping, piping components, and piping elements exposed to lubricating oil.

BVPS manages the aging effects for piping components exposed to lubricating oil with a combination of the Lubricating Oil Analysis Program (Section B.2.24) and the One-Time Inspection Program (Section B.2.30).

The Lubricating Oil Analysis Program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to loss of material, cracking or reduction of heat transfer.

The One-Time Inspection Program provides an inspection that either verifies that unacceptable degradation is not occurring or triggers additional actions that assure the intended function of affected components will be maintained during the period of extended operation.

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). BVPS did not identify wear as an aging effect requiring management for elastomer seals and components exposed to air. These components are susceptible to other aging effects (e.g., hardening and loss of strength, and cracking), which are addressed in Section 3.3.2.2.5.1.

3.3.2.2.14 Loss of Material Due to Cladding Breach

Loss of material from a cladding breach could occur for PWR charging pump casings with stainless steel cladding exposed to treated borated water. NRC Information Notice 94-63 [Reference 3.0-2] alerted all holders of operating licenses or construction permits to the potential for significant damage that could result from corrosion of reactor system components caused by cracking of the stainless steel cladding. The description of the circumstances surrounding this information notice was described as follows:

> *During July and August 1993 the Virginia Electric Power Company discovered severe corrosion damage of the carbon steel casing of a high head safety injection pump at North Anna Unit 1. The damage was caused by cracks through the stainless steel cladding in the pump that allowed corrosive attack by the boric acid coolant. The cracks were discovered when the pump was disassembled for maintenance and rust was observed on the otherwise shiny surface of the cladding in the discharge section of the pump.*

The charging pumps at BVPS are fabricated from stainless steel and not from carbon steel with stainless steel cladding. Therefore, loss of material due to cladding breach is not applicable for BVPS.

3.3.2.2.15 Quality Assurance for Aging Management of Nonsafety-related Components

See Appendix B, Section B.1.3, for discussion of BVPS quality assurance procedures and administrative controls for aging management programs.

3.3.2.3 Time-Limited Aging Analyses

The following Time-Limited Aging Analyses (TLAAs) are associated with Auxiliary Systems components. The section of the application that contains the TLAA review results is indicated in parentheses.

1. Cumulative Fatigue Damage (Section 4.3, Metal Fatigue), and
2. Crane Cyclic Analyses (Section 4.7, Other TLAAs).

3.3.3 CONCLUSION

The Auxiliary Systems components/commodities having aging effects requiring management have been evaluated, and aging management programs have been selected to manage the aging effects. A description of the aging management programs is provided in Appendix B, along with a demonstration that the identified aging effects will be managed for the period of extended operation.

Therefore, based on the demonstration provided in Appendix B, the effects of aging will be adequately managed so that there is reasonable assurance that the intended functions of Auxiliary Systems components/commodities will be maintained consistent with the current licensing basis during the period of extended operation.

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

Table 3.3.1 : Auxiliary Systems, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
3.3.1-01	Steel cranes - structural girders exposed to air - indoor uncontrolled (external)	Cumulative fatigue damage	TLAA to be evaluated for structural girders of cranes. See the Standard Review Plan, Section 4.7 for generic guidance for meeting the requirements of 10 CFR 54.21(c)(1).	Yes, TLAA	Consistent with NUREG-1801. Crane fatigue is addressed as a TLAA in Section 4.7.6. Further evaluation is documented in Section 3.3.2.2.1.
3.3.1-02	Steel and stainless steel piping, piping components, piping elements, and heat exchanger components exposed to air - indoor uncontrolled, treated borated water or treated water	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Consistent with NUREG-1801, with added components. The aging effect is also applicable to nickel alloy in this environment. Fatigue of metal components is addressed as a TLAA in Section 4.3. Further evaluation is documented in Section 3.3.2.2.1.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-03	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. Further evaluation is documented in Section 3.3.2.2.2.
3.3.1-04	BWR only—not used				
3.3.1-05	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	Consistent with NUREG-1801 for similar BVPS PWR components. BVPS manages the aging effect with a combination of the Water Chemistry (B.2.42) and One-Time Inspection (B.2.30) Programs. Further evaluation is documented in Section 3.3.2.2.3.2.
3.3.1-06	Stainless steel diesel engine exhaust piping, piping components, and piping elements exposed to diesel exhaust	Cracking due to stress corrosion cracking	Plant specific	Yes, plant specific	Consistent with NUREG-1801. BVPS manages the aging effect with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22) Program. Further evaluation is documented in Section 3.3.2.2.3.3.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-07	Stainless steel non-regenerative heat exchanger components exposed to treated borated water >60°C (>140°F)	Cracking due to stress corrosion cracking and cyclic loading	Water Chemistry 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	Consistent with NUREG-1801, with exception. BVPS manages cracking of Chemical and Volume Control System heat exchanger components with a combination of the Water Chemistry (B.2.42) and One-Time Inspection (B.2.30) Programs. Temperature and radioactivity monitoring of shell side water is performed by installed instrumentation. The exception is related to the eddy-current testing: verification of program effectiveness will be performed by the One-Time Inspection (B.2.30) Program instead of periodic testing. Further evaluation is documented in Section 3.3.2.2.4.1.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-08	Stainless steel regenerative heat exchanger components exposed to treated borated water >60°C (>140°F)	Cracking due to stress corrosion cracking and cyclic loading	Water Chemistry 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	Consistent with NUREG-1801, with additional components. BVPS manages the aging effect with the Water Chemistry (B.2.42) and the One-Time Inspection (B.2.30) Programs. Additional heat exchangers in the Boron Recovery and Reactor Plant Vents and Drains Systems are also aligned to this row. Further evaluation is documented in Section 3.3.2.2.4.2.
3.3.1-09	Stainless steel high-pressure pump casing in PWR chemical and volume control system	Cracking due to stress corrosion cracking and cyclic loading	Water Chemistry 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	Not applicable. Cracking is not applicable to BVPS because the Chemical and Volume Control System pumps operate below the 140°F threshold for cracking. Further evaluation is documented in Section 3.3.2.2.4.3.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**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 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. See Item 3.3.1-41 for management of cracking of high strength bolting in Auxiliary Systems. High strength bolts, where present, are not re-used following removal. Further evaluation is documented in Section 3.3.2.2.4.4.
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	Consistent with NUREG-1801. BVPS manages the aging effects with the External Surfaces Monitoring (B.2.15) Program. Further evaluation is documented in Section 3.3.2.2.5.1.
3.3.1-12	Elastomer lining exposed to treated water or treated borated water	Hardening and loss of strength due to elastomer degradation	A plant-specific aging management program that determines and assesses the qualified life of the linings in the environment is to be evaluated.	Yes, plant specific	Not applicable. BVPS Fuel Pool Cooling and Purification System components do not have elastomer linings. Further evaluation is documented in Section 3.3.2.2.5.2.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	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	Consistent with NUREG-1801, with exception. Unit 1 has Boral neutron-absorbing sheets in Spent Fuel Pool storage racks; Unit 2 does not. Reduction of neutron-absorbing capacity for Boral does not need aging management. However, the aging effect of loss of material will be managed by the Water Chemistry (B.2.42) Program. Further evaluation is documented in 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	Consistent with NUREG-1801, with additional components. BVPS manages the aging effect with a combination of the Lubricating Oil Analysis (B.2.24) and One-Time Inspection (B.2.30) Programs. Further evaluation is documented in Section 3.3.2.2.7.1.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-15	Steel reactor coolant pump oil collection system piping, tubing, and valve bodies exposed to lubricating oil	Loss of material due to general, pitting, and crevice corrosion	Lubricating Oil Analysis and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801. BVPS manages the aging effect with a combination of the Lubricating Oil Analysis (B.2.24) and One-Time Inspection (B.2.30) Programs. Further evaluation is documented in Section 3.3.2.2.7.1.
3.3.1-16	Steel reactor coolant pump oil collection system tank exposed to lubricating oil	Loss of material due to general, pitting, and crevice corrosion	Lubricating Oil Analysis and One-Time Inspection to evaluate the thickness of the lower portion of the tank	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801. BVPS manages the aging effect with a combination of the Lubricating Oil Analysis (B.2.24) and One-Time Inspection (B.2.30) Programs. Further evaluation is documented in Section 3.3.2.2.7.1.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-17	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, with additional components. The aging comparison to this BWR item is appropriate for some treated (unborated) water systems in PWRs with the same material, environment and aging effect. BVPS manages the aging effects with a combination of the Water Chemistry (B.2.42) and One-Time Inspection (B.2.30) Programs. Further evaluation is documented in Section 3.3.2.2.7.2.
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	Consistent with NUREG-1801. BVPS manages the aging effect with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22) Program. Further evaluation is documented in Section 3.3.2.2.7.3.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-19	Steel (with or without coating or wrapping) piping, piping components, and piping elements exposed to soil	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion	Buried Piping and Tanks Surveillance or Buried Piping and Tanks Inspection	No Yes, detection of aging effects and operating experience are to be further evaluated	Consistent with NUREG-1801, with additional components. BVPS manages the aging effect with the Buried Piping and Tanks Inspection (B.2.8) Program. Further evaluation is documented in Section 3.3.2.2.8.
3.3.1-20	Steel piping, piping components, piping elements, and tanks exposed to fuel oil	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion, and fouling	Fuel Oil Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801, with AMP exceptions. BVPS manages the aging effect with a combination of Fuel Oil Chemistry (B.2.20) and One-Time Inspection (B.2.30) Programs. Further evaluation is documented in Section 3.3.2.2.9.1.
3.3.1-21	Steel heat exchanger components exposed to lubricating oil	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion, and fouling	Lubricating Oil Analysis and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801. BVPS manages the aging effect with a combination of the Lubricating Oil Analysis (B.2.24) Program and One-Time Inspection (B.2.30) Programs. Further evaluation is documented in Section 3.3.2.2.9.2.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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. BVPS Fuel Pool Cooling and Purification System components do not have elastomer linings or stainless steel cladding. Further evaluation is documented in Section 3.3.2.2.10.1.
3.3.1-23	BWR only—not used				
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	Consistent with NUREG-1801, with some difference in components. BVPS manages the aging effects with a combination of the Water Chemistry (B.2.42) and One-Time Inspection (B.2.30) Programs. Further evaluation is documented in Section 3.3.2.2.10.2.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-25	Copper alloy HVAC piping, piping components, piping elements exposed to condensation (external)	Loss of material due to pitting and crevice corrosion	A plant-specific aging management program is to be evaluated.	Yes, plant specific	Consistent with NUREG-1801, with additional components. Components in several systems other than HVAC are included. BVPS manages the aging effect for various components with one of the following AMPs: External Surfaces Monitoring (B.2.15), Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22), or Bolting Integrity (B.2.6). Further evaluation is documented in Section 3.3.2.2.10.3.
3.3.1-26	Copper alloy piping, piping components, and piping elements exposed to lubricating oil	Loss of material due to pitting and crevice corrosion	Lubricating Oil Analysis and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801, with additional components. BVPS manages the aging effect with a combination of the Lubricating Oil Analysis (B.2.24) and One-Time Inspection (B.2.30) Programs. Further evaluation is documented in Section 3.3.2.2.10.4.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**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	Consistent with NUREG-1801. BVPS manages the aging effect using periodic visual inspections with one of the following AMPs: Bolting Integrity (B.2.6), External Surfaces Monitoring (B.2.15), Fire Protection (B.2.16), and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22). Further evaluation is documented in Section 3.3.2.2.10.5.
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	Consistent with NUREG-1801. BVPS manages the aging effect with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22) Program. Further evaluation is documented in Section 3.3.2.2.10.6.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
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	Consistent with NUREG-1801. BVPS manages the aging effect with the Buried Piping and Tanks Inspection (B.2.8) Program. Further evaluation is documented in Section 3.3.2.2.10.7.
3.3.1-30	BWR only—not used				
3.3.1-31	Copper alloy piping, piping components, and piping elements exposed to treated water	Loss of material due to pitting, crevice, and galvanic corrosion	Water Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801. The aging comparison to this BWR item is appropriate for treated (unborated) water systems in PWRs. BVPS manages the aging effect with a combination of the Water Chemistry (B.2.42) and One-Time Inspection (B.2.30) Programs. Further evaluation is documented in Section 3.3.2.2.11.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	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, with AMP exceptions. BVPS manages the aging effect with a combination of the Fuel Oil Chemistry (B.2.20) and One-Time Inspection (B.2.30) Programs. Further evaluation is documented in Section 3.3.2.2.12.1.
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	Consistent with NUREG-1801, with additional components. BVPS manages the aging effect with a combination of the Lubricating Oil Analysis (B.2.24) Program and One-Time Inspection (B.2.30) Programs. Further evaluation is documented in Section 3.3.2.2.12.2.
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. BVPS did not identify wear as an aging effect for elastomer components in this environment. Further evaluation is documented in Section 3.3.2.2.13.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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. BVPS does not have steel with stainless steel cladding as described in this line item. Further evaluation is documented in Section 3.3.2.2.14.
3.3.1-36	BWR only—not used				
3.3.1-37	BWR only—not used				
3.3.1-38	Stainless steel piping, piping components, and piping elements exposed to treated water >60°C (>140°F)	Cracking due to stress corrosion cracking	BWR Stress Corrosion Cracking and Water Chemistry	No	Consistent with NUREG-1801, with different program assignments. The aging comparison to this BWR item is appropriate for treated (unborated) water systems in PWRs and was used for comparison because no corresponding NUREG-1801 row existed for PWRs. BVPS manages the aging effect with a combination of the Water Chemistry (B.2.42) and One-Time Inspection (B.2.30) Programs.
3.3.1-39	BWR only—not used				

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
3.3.1-40	Steel tanks in diesel fuel oil system exposed to air - outdoor (external)	Loss of material due to general, pitting, and crevice corrosion	Aboveground Steel Tanks	No	Not applicable. No BVPS AMR line items roll up to this item.
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	Consistent with NUREG-1801. BVPS manages the aging effect with the Bolting Integrity (B.2.6) Program.
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	Consistent with NUREG-1801. BVPS manages the aging effect with the Bolting Integrity (B.2.6) Program.
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. BVPS manages the aging effect with the Bolting Integrity (B.2.6) Program.
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. BVPS manages the aging effect with the Bolting Integrity (B.2.6) Program.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	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	Not applicable. No BVPS AMR line items roll up to this item. BVPS did not identify loss of preload as an aging effect for closure bolting. However, BVPS assigned the Bolting Integrity (B.2.6) Program to manage aging of in-scope bolting. The Bolting Integrity (B.2.6) Program is consistent with NUREG-1801.
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. BVPS manages the aging effect with the Closed-Cycle Cooling Water System (B.2.9) Program.
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. BVPS manages the aging effect with the Closed-Cycle Cooling Water System (B.2.9) Program.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	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. BVPS manages the aging effect with the Closed-Cycle Cooling Water System (B.2.9) Program.
3.3.1-49	BWR only—not used				
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, with additional non-piping components. BVPS manages the aging effect with the Closed-Cycle Cooling Water System (B.2.9) Program. The aging effect is also applicable to nickel alloy in this environment.
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. BVPS manages the aging effect with the Closed-Cycle Cooling Water System (B.2.9) Program.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	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. BVPS manages the aging effect with the Closed-Cycle Cooling Water System (B.2.9) Program.
3.3.1-53	Steel compressed air system piping, piping components, and piping elements exposed to condensation (internal)	Loss of material due to general and pitting corrosion	Compressed Air Monitoring	No	Consistent with NUREG-1801, with a different program assignment. Components in the Fire Protection System have been aligned to this item, and BVPS manages the aging effect with the Fire Water System (B.2.17) Program.
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	Consistent with NUREG-1801, with a different program assignment. Components in the Steam Generator Blowdown and Compressed Air Systems have been aligned to this item, and BVPS manages the aging effect with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22) Program.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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	Not applicable. No BVPS AMR line items roll up to this item. BVPS addresses the aging effect for steel bolting in Item 3.3.1-43 and manages the aging effect with the Bolting Integrity (B.2.6) Program.
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. BVPS manages the aging effect with the External Surfaces Monitoring (B.2.15) Program.
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	Not applicable. No BVPS AMR line items roll up to this item. BVPS addressed this aging effect for steel piping in Item 3.3.1-58.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**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, with a different program for some components. For most components that align with this line item, BVPS manages the aging effect with the External Surfaces Monitoring (B.2.15) Program. BVPS manages the aging effect for the external surfaces of Fire Protection System components, however, with either the Fire Protection (B.2.16) or Fire Water System (B.2.17) Programs.
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. BVPS manages the aging effect with the External Surfaces Monitoring (B.2.15) Program.
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. BVPS manages the aging effect with the External Surfaces Monitoring (B.2.15) Program.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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	Consistent with NUREG-1801, with an AMP exception. BVPS manages the aging effect for fire stops with the Fire Protection (B.2.16) 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	Consistent with NUREG-1801, with different components and a different AMP. Some aluminum cable trays and conduits are submerged in raw water. Loss of material for these components is managed by the Structures Monitoring (B.2.39) Program.
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	Consistent with NUREG-1801, with an AMP exception. BVPS manages the aging effect as it relates to the fire barrier function with the Fire Protection (B.2.16) 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, with AMP exceptions. BVPS manages the aging effect with a combination of the Fire Protection (B.2.16) and Fuel Oil Chemistry (B.2.20) Programs.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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	Not applicable. No BVPS AMR line items roll up to this item. However, BVPS uses the Fire Protection (B.2.16) and Structures Monitoring (B.2.39) Programs to confirm that the aging effects do not occur.
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	Consistent with NUREG-1801, with AMP exception. BVPS manages the aging effect with the Fire Protection (B.2.16) and Structures Monitoring (B.2.39) Programs. This item includes concrete hatches.
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	Not applicable. No BVPS AMR line items roll up to this item.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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, with additional components. BVPS manages the aging effect with the Fire Water System (B.2.17) Program. Bolting and heat exchanger components have been added.
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. BVPS manages the aging effect with the Fire Water System (B.2.17) 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, with additional components. BVPS manages this aging effect with the Fire Water System (B.2.17) Program. Heat exchanger components have been added.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	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	Consistent with NUREG-1801, with additional components. BVPS manages the aging effects with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22) Program. Heat exchanger components have been added.
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	Consistent with NUREG-1801. BVPS manages the aging effects with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22) Program.
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	Consistent with NUREG-1801. BVPS manages the aging effect with the Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B.2.23) Program.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
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	Not applicable. BVPS aging evaluation of crane components considers loss of material due to wear to be an insignificant contributor to loss of material due to relatively infrequent crane use. BVPS identifies loss of material due to general corrosion to be an aging effect requiring management for crane rails, as described in Item 3.3.1-73.
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	Not applicable. BVPS does not have elastomer components in raw water subject to aging management review that are exposed to raw water.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	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, with additional components and a different AMP for some components. BVPS manages the aging effect with the Open-Cycle Cooling Water System (B.2.32) Program for the River Water System (Unit 1 only) and Service Water System (Unit 2 only). Other systems containing untreated (raw) water have been aligned to this item number for aging comparisons. BVPS manages the aging effect for these components with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22) Program.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
3.3.1-77	Steel heat exchanger components exposed to raw water	Loss of material due to general, pitting, crevice, galvanic, and microbiologically influenced corrosion, and fouling	Open-Cycle Cooling Water System	No	Consistent with NUREG-1801, with additional components and a different AMP for some components. BVPS manages the aging effect with the Open-Cycle Cooling Water System (B.2.32) Program for components cooled by the River Water System (Unit 1 only) and Service Water System (Unit 2 only). Additionally, the Domestic Water System contains untreated (raw) water and includes heat exchanger components that have been aligned to this item number for aging comparisons. BVPS manages the aging effect for these additional components with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22) Program.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
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, with additional components and a different AMP for some components. BVPS manages the aging effect with the Open-Cycle Cooling Water System (B.2.32) Program for the Service Water System (Unit 2 only). Other systems include components containing untreated (raw) water have been aligned to this item number for aging comparisons. BVPS manages the aging effect for these additional components with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22) Program. Additionally, some structural component supports are submerged in raw water. The aging effects for these supports are managed by the Structures Monitoring (B.2.39) Program or the ASME Section XI, Subsection IWF (B.2.4) Program.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	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, with additional components and a different AMP for some components. BVPS manages the aging effect with the Open-Cycle Cooling Water System (B.2.32) Program for components supplied by the River Water System (Unit 1 only) and Service Water System (Unit 2 only). Other systems include components that contain untreated (raw) water that have been aligned to this item number for aging comparisons. BVPS manages the aging effect for these additional components with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22) Program. Heat exchanger components have also been aligned to this row.
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, with additional components. BVPS manages the aging effect with the Open-Cycle Cooling Water System (B.2.32) Program.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	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, with additional components and a different AMP for some components. BVPS manages the aging effect with the Open-Cycle Cooling Water System (B.2.32) Program for components supplied by the River Water System (Unit 1 only). Other systems include components that contain untreated (raw) water that have been aligned to this item number for aging comparisons. BVPS manages the aging effect for these additional components with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22) Program.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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, with additional components and a different AMP for some components. BVPS manages the aging effect with the Open-Cycle Cooling Water System (B.2.32) Program for components supplied by the River Water System (Unit 1 only) and Service Water System (Unit 2 only). The Domestic Water System also includes heat exchanger components that contain untreated (raw) water that have been aligned to this item number for aging comparisons. BVPS manages the aging effect for these additional components with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22) Program.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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, with additional components and a different AMP for some components. BVPS manages the aging effect with the Open-Cycle Cooling Water System (B.2.32) Program for components supplied by the River Water System (Unit 1 only) and Service Water System (Unit 2 only). The Fire Protection System also includes heat exchanger components that contain untreated (raw) water that have been aligned to this item number for aging comparisons. BVPS manages the aging effect for these additional components with the Fire Water System (B.2.17) Program.
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, with additional components and AMP exceptions. BVPS manages the aging effect for susceptible components using the Selective Leaching of Materials Inspection (B.2.36) Program.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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, with additional components and AMP exceptions. BVPS manages the aging effect with the Selective Leaching of Materials Inspection (B.2.36) Program.
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	Not applicable. No BVPS AMR line items roll up to this item.
3.3.1-87	Boraflex spent fuel storage racks neutron-absorbing sheets exposed to treated borated water	Reduction of neutron-absorbing capacity due to Boraflex degradation	Boraflex Monitoring	No	Not applicable. No BVPS AMR line items roll up to this item. Unit 1 does not have Boraflex neutron-absorbing sheets in the Spent Fuel Pool storage racks. BVPS Unit 2 does have Boraflex neutron-absorbing sheets in the Spent Fuel Pool storage racks, but does not credit Boraflex with a neutron-absorbing function.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
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, with additional components. BVPS manages the aging effect with the Boric Acid Corrosion (B.2.7) Program.
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. BVPS manages the aging effect with the Boric Acid Corrosion (B.2.7) Program. The aging effect is also applicable to galvanized steel and gray cast iron in this environment.
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, with added components. BVPS manages the aging effect with the Water Chemistry (B.2.42) Program. The aging effect is also applicable to nickel alloy in this environment.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-91	Stainless steel and steel with stainless steel cladding piping, piping components, and piping elements exposed to treated borated water	Loss of material due to pitting and crevice corrosion	Water Chemistry	No	Consistent with NUREG-1801, with added components. BVPS manages the aging effect with the Water Chemistry (B.2.42) Program. The aging effect is also applicable to nickel alloy in this environment.
3.3.1-92	Galvanized steel piping, piping components, and piping elements exposed to air - indoor uncontrolled	None	None	NA - No AEM or AMP	Consistent with NUREG-1801. Air-indoor uncontrolled environment is considered to be equivalent both internally and externally for aging comparisons.
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. An air-indoor uncontrolled environment is considered to be equivalent both internally and externally for aging comparisons. Air - indoor uncontrolled is considered to be equivalent to dried air for aging comparisons. Tanks fabricated of fiberglass, a glass composition, are evaluated for aging effects as glass.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1					
Item Number	**Component/ Commodity**	**Aging Effect/ Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
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, with additional components added. An air-indoor uncontrolled environment is considered to be equivalent both internally and externally for aging comparisons.
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	Consistent with NUREG-1801.
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, with an additional component.
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, with additional components. The aging effect is also applicable to nickel alloy in this environment.

Table 3.3.1 (continued): Auxiliary Systems, NUREG-1801 Volume 1

Item Number	Component/ Commodity	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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, with additional components. The aging effect is also applicable to nickel alloy in this environment.

Table 3.3.2-1
Auxiliary Systems –
Area Ventilation System—Control Area –
Summary of Aging Management Evaluation

Table 3.3.2-1 : Area Ventilation System—Control Area

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Air dryer	Pressure boundary	Copper alloy <15% Zn	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-9 (AP-78)	3.3.1-28	E
2	Air dryer	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
3	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C

Table 3.3.2-1 (continued): Area Ventilation System—Control Area									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
4	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
5	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
6	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
7	Bolting	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C

Table 3.3.2-1 (continued): Area Ventilation System—Control Area

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
8	Bolting	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
9	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
10	Bolting	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
11	Bolting	Pressure boundary	Steel	Condensation -EXT	Loss of material	Bolting Integrity (B.2.6)	VII.D-1 (A-103)	3.3.1-44	A
12	Damper housing	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
13	Damper housing	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F1-2 (A-10)	3.3.1-56	A
14	Damper housing	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-1 (continued): Area Ventilation System—Control Area

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
15	Duct	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
16	Duct	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F1-2 (A-10)	3.3.1-56	A
17	Duct	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
18	Fan housing	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
19	Fan housing	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F1-2 (A-10)	3.3.1-56	A
20	Fan housing	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-1 (continued): Area Ventilation System—Control Area

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
21	Fan housing	Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
22	Fan housing	Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F1-2 (A-10)	3.3.1-56	A
23	Filter housing	Pressure boundary	Aluminum	Gas	None	None	VII.J-2 (AP-37)	3.3.1-97	A
24	Filter housing	Pressure boundary	Aluminum	Air - indoor uncontrolled-EXT	None	None	VII.J-1 (AP-36)	3.3.1-95	A
25	Filter housing	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
26	Filter housing	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F1-2 (A-10)	3.3.1-56	A

Table 3.3.2-1 (continued): Area Ventilation System—Control Area									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
27	Filter housing	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
28	Filter housing (bowl)	Pressure boundary	Polymer	Dried air	None	None	N/A	N/A	F
29	Filter housing (bowl)	Pressure boundary	Polymer	Air - indoor uncontrolled-EXT	None	None	N/A	N/A	F
30	Flexible connection	Pressure boundary	Elastomers	Air - indoor uncontrolled	Cracking	External Surfaces Monitoring (B.2.15)	N/A	N/A	H, 303
31	Flexible connection	Pressure boundary	Elastomers	Air - indoor uncontrolled	Hardening and Loss of strength	External Surfaces Monitoring (B.2.15)	VII.F1-7 (A-17)	3.3.1-11	E, 303
32	Flexible connection	Pressure boundary	Elastomers	Air - indoor uncontrolled-EXT	Cracking	External Surfaces Monitoring (B.2.15)	N/A	N/A	H
33	Flexible connection	Pressure boundary	Elastomers	Air - indoor uncontrolled-EXT	Hardening and Loss of strength	External Surfaces Monitoring (B.2.15)	VII.F1-7 (A-17)	3.3.1-11	E
34	Flexible connection	Pressure boundary	Elastomers	Air with borated water leakage-EXT	None	None	N/A	N/A	G

Table 3.3.2-1 (continued): Area Ventilation System—Control Area									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
35	Heat exchanger (condenser tube)	Pressure boundary	Copper alloy <15% Zn	Raw water	Loss of material	Open-Cycle Cooling Water System (B.2.32)	VII.C1-3 (A-65)	3.3.1-82	A
36	Heat exchanger (condenser tube)	Pressure boundary	Copper alloy <15% Zn	Raw water	Reduction of heat transfer	Open-Cycle Cooling Water System (B.2.32)	VII.C1-6 (A-72)	3.3.1-83	A
37	Heat exchanger (condenser tube)	Pressure boundary	Copper alloy <15% Zn	Gas-EXT	None	None	VII.J-4 (AP-9)	3.3.1-97	C
38	Heat exchanger (header)	Leakage boundary (spatial)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.F1-11 (A-63)	3.3.1-48	A
39	Heat exchanger (header)	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
40	Heat exchanger (header)	Leakage boundary (spatial)	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A
41	Heat exchanger (header)	Pressure boundary	Steel	Raw water	Loss of material	Open-Cycle Cooling Water System (B.2.32)	VII.C1-5 (A-64)	3.3.1-77	A
42	Heat exchanger (header)	Pressure boundary	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A

Table 3.3.2-1 (continued): Area Ventilation System—Control Area

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
43	Heat exchanger (housing)	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
44	Heat exchanger (housing)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F1-10 (AP-41)	3.3.1-58	A
45	Heat exchanger (shell)	Pressure boundary	Steel	Gas	None	None	VII.J-23 (AP-6)	3.3.1-97	A
46	Heat exchanger (shell)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F1-10 (AP-41)	3.3.1-58	A
47	Heat exchanger (tube)	Leakage boundary (spatial)	Copper alloy <15% Zn	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.F1-8 (AP-34)	3.3.1-51	A
48	Heat exchanger (tube)	Leakage boundary (spatial)	Copper alloy <15% Zn	Condensation -EXT	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F1-16 (A-46)	3.3.1-25	E

Table 3.3.2-1 (continued): Area Ventilation System—Control Area

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
49	Heat exchanger (tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Raw water	Loss of material	Open-Cycle Cooling Water System (B.2.32)	VII.C1-3 (A-65)	3.3.1-82	A
50	Heat exchanger (tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Raw water	Reduction of heat transfer	Open-Cycle Cooling Water System (B.2.32)	VII.C1-6 (A-72)	3.3.1-83	A
51	Heat exchanger (tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Condensation -EXT	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F1-16 (A-46)	3.3.1-25	E
52	Heat exchanger (tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Condensation -EXT	Reduction of heat transfer	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	N/A	N/A	H
53	Heat exchanger (waterbox)	Pressure boundary	Gray cast iron	Raw water	Loss of material	Open-Cycle Cooling Water System (B.2.32)	VII.C1-5 (A-64)	3.3.1-77	A

Table 3.3.2-1 (continued): Area Ventilation System—Control Area

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
54	Heat exchanger (waterbox)	Pressure boundary	Gray cast iron	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C1-11 (A-51)	3.3.1-85	B
55	Heat exchanger (waterbox)	Pressure boundary	Gray cast iron	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F1-10 (AP-41)	3.3.1-58	A
56	Heat exchanger (waterbox)	Pressure boundary	Gray cast iron	Condensation -EXT	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	N/A	N/A	G
57	Heater housing	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
58	Heater housing	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F1-2 (A-10)	3.3.1-56	A
59	Isokinetic nozzle	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
60	Isokinetic nozzle	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A

Table 3.3.2-1 (continued): Area Ventilation System—Control Area

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
61	Moisture separator	Pressure boundary	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F1-3 (A-08)	3.3.1-72	A
62	Moisture separator	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F1-2 (A-10)	3.3.1-56	A
63	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
64	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F1-1 (A-09)	3.3.1-27	E

Table 3.3.2-1 (continued): Area Ventilation System—Control Area									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
65	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
66	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
67	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F1-3 (A-08)	3.3.1-72	A

Table 3.3.2-1 (continued): Area Ventilation System—Control Area

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
68	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Gas	None	None	VII.J-23 (AP-6)	3.3.1-97	A
69	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F1-2 (A-10)	3.3.1-56	A
70	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
71	Piping	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304

Table 3.3.2-1 (continued): Area Ventilation System—Control Area

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
72	Piping	Pressure boundary	Copper alloy <15% Zn	Dried air	None	None	VII.J-3 (AP-8)	3.3.1-98	A
73	Piping	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
74	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
75	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
76	Piping	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
77	Piping	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F1-2 (A-10)	3.3.1-56	A
78	Tank	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A

Table 3.3.2-1 (continued): Area Ventilation System—Control Area

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
79	Tank	Leakage boundary (spatial)	Stainless steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-15 (A-54)	3.3.1-79	E, 317
80	Tank	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
81	Tank	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
82	Tank	Pressure boundary	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A
83	Tank	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F1-2 (A-10)	3.3.1-56	A
84	Tank (air compressor receiver)	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A

Table 3.3.2-1 (continued): Area Ventilation System—Control Area

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
85	Tank (air compressor receiver)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F1-2 (A-10)	3.3.1-56	A
86	Tubing	Pressure boundary	Copper alloy <15% Zn	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-9 (AP-78)	3.3.1-28	E
87	Tubing	Pressure boundary	Copper alloy <15% Zn	Dried air	None	None	VII.J-3 (AP-8)	3.3.1-98	A
88	Tubing	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
89	Tubing	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
90	Tubing	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
91	Tubing	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A

Table 3.3.2-1 (continued): Area Ventilation System—Control Area

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
92	Valve body	Leakage boundary (spatial)	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F1-1 (A-09)	3.3.1-27	E
93	Valve body	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
94	Valve body	Pressure boundary	Aluminum	Gas	None	None	VII.J-2 (AP-37)	3.3.1-97	A
95	Valve body	Pressure boundary	Aluminum	Air - indoor uncontrolled-EXT	None	None	VII.J-1 (AP-36)	3.3.1-95	A
96	Valve body	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
97	Valve body	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A

Table 3.3.2-1 (continued): Area Ventilation System—Control Area

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
98	Valve body	Pressure boundary	Copper alloy <15% Zn	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-9 (AP-78)	3.3.1-28	E
99	Valve body	Pressure boundary	Copper alloy <15% Zn	Dried air	None	None	VII.J-3 (AP-8)	3.3.1-98	A
100	Valve body	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
101	Valve body	Pressure boundary	Copper alloy >15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304
102	Valve body	Pressure boundary	Copper alloy >15% Zn	Dried air	None	None	VII.J-3 (AP-8)	3.3.1-98	A
103	Valve body	Pressure boundary	Copper alloy >15% Zn	Gas	None	None	VII.J-4 (AP-9)	3.3.1-97	A
104	Valve body	Pressure boundary	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A

Table 3.3.2-1 (continued): Area Ventilation System—Control Area

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
105	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
106	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
107	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
108	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F1-2 (A-10)	3.3.1-56	A

Table 3.3.2-2
Auxiliary Systems –
Area Ventilation System—Plant Areas –
Summary of Aging Management Evaluation

Table 3.3.2-2 : Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
2	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
3	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
4	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
5	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Condensation -EXT	Loss of material	Bolting Integrity (B.2.6)	VII.D-1 (A-103)	3.3.1-44	A
6	Bolting	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
7	Bolting	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
8	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
9	Bolting	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
10	Bolting	Pressure boundary	Steel	Condensation -EXT	Loss of material	Bolting Integrity (B.2.6)	VII.D-1 (A-103)	3.3.1-44	A
11	Damper housing	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
12	Damper housing	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-2 (A-10)	3.3.1-56	A
13	Damper housing	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
14	Damper housing	Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
15	Damper housing	Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-2 (A-10)	3.3.1-56	A
16	Damper housing	Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
17	Drip pan	Leakage boundary (spatial)	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F2-1 (A-09)	3.3.1-27	E
18	Drip pan	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
19	Drip pan	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
20	Drip pan	Leakage boundary (spatial)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F2-3 (A-08)	3.3.1-72	A
21	Drip pan	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-2 (A-10)	3.3.1-56	A
22	Drip pan	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
23	Duct	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
24	Duct	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-2 (A-10)	3.3.1-56	A
25	Duct	Pressure boundary	Steel	Air - outdoor-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-9 (A-78)	3.3.1-58	A

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
26	Duct	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
27	Duct	Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
28	Duct	Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-2 (A-10)	3.3.1-56	A
29	Duct	Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
30	Fan housing	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
31	Fan housing	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-2 (A-10)	3.3.1-56	A

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
32	Fan housing	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
33	Filter housing	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
34	Filter housing	Pressure boundary	Steel	Gas	None	None	VII.J-23 (AP-6)	3.3.1-97	A
35	Filter housing	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-2 (A-10)	3.3.1-56	A
36	Filter housing	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
37	Flexible connection	Pressure boundary	Elastomers	Air - indoor uncontrolled	Cracking	External Surfaces Monitoring (B.2.15)	VII.F2-7 (A-17)	3.3.1-11	H, 303
38	Flexible connection	Pressure boundary	Elastomers	Air - indoor uncontrolled	Hardening and loss of strength	External Surfaces Monitoring (B.2.15)	VII.F2-7 (A-17)	3.3.1-11	E, 303

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
39	Flexible connection	Pressure boundary	Elastomers	Air - indoor uncontrolled-EXT	Cracking	External Surfaces Monitoring (B.2.15)	N/A	N/A	H
40	Flexible connection	Pressure boundary	Elastomers	Air - indoor uncontrolled-EXT	Hardening and loss of strength	External Surfaces Monitoring (B.2.15)	VII.F2-7 (A-17)	3.3.1-11	E
41	Flexible connection	Pressure boundary	Elastomers	Air with borated water leakage-EXT	None	None	N/A	N/A	G
42	Flexible hose	Pressure boundary	Copper alloy >15% Zn	Gas	None	None	VII.J-4 (AP-9)	3.3.1-97	A
43	Flexible hose	Pressure boundary	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	A
44	Flexible hose	Pressure boundary	Copper alloy >15% Zn	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-14 (A-46)	3.3.1-25	E
45	Flexible hose	Pressure boundary	Copper alloy >15% Zn	Condensation -EXT	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	N/A	N/A	H

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
46	Heat exchanger (channel)	Leakage boundary (spatial)	Stainless steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-10 (A-52)	3.3.1-50	C
47	Heat exchanger (channel)	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
48	Heat exchanger (channel)	Leakage boundary (spatial)	Stainless steel	Condensation -EXT	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F2-1 (A-09)	3.3.1-27	E
49	Heat exchanger (channel)	Leakage boundary (spatial)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.F2-9 (A-63)	3.3.1-48	A
50	Heat exchanger (channel)	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
51	Heat exchanger (channel)	Leakage boundary (spatial)	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A
52	Heat exchanger (channel)	Pressure boundary	Stainless steel	Raw water	Loss of material	Open-Cycle Cooling Water System (B.2.32)	VII.C1-15 (A-54)	3.3.1-79	C

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
53	Heat exchanger (channel)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
54	Heat exchanger (channel)	Pressure boundary	Stainless steel	Condensation -EXT	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F2-1 (A-09)	3.3.1-27	E
55	Heat exchanger (channel)	Pressure boundary	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.F2-9 (A-63)	3.3.1-48	A
56	Heat exchanger (channel)	Pressure boundary	Steel	Raw water	Loss of material	Open-Cycle Cooling Water System (B.2.32)	VII.C1-5 (A-64)	3.3.1-77	A
57	Heat exchanger (channel)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
58	Heat exchanger (channel)	Pressure boundary	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A
59	Heat exchanger (condenser channel)	Pressure boundary	Gray cast iron	Raw water	Loss of material	Open-Cycle Cooling Water System (B.2.32)	VII.C1-5 (A-64)	3.3.1-77	A

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
60	Heat exchanger (condenser channel)	Pressure boundary	Gray cast iron	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C1-11 (A-51)	3.3.1-85	D
61	Heat exchanger (condenser channel)	Pressure boundary	Gray cast iron	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
62	Heat exchanger (condenser channel)	Pressure boundary	Gray cast iron	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A
63	Heat exchanger (condenser channel)	Pressure boundary	Gray cast iron	Condensation -EXT	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	N/A	N/A	G
64	Heat exchanger (condenser shell)	Pressure boundary	Steel	Gas	None	None	VII.J-23 (AP-6)	3.3.1-97	C
65	Heat exchanger (condenser shell)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-8 (AP-41)	3.3.1-59	A
66	Heat exchanger (condenser shell)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
67	Heat exchanger (condenser tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Raw water	Loss of material	Open-Cycle Cooling Water System (B.2.32)	VII.C1-3 (A-65)	3.3.1-82	A
68	Heat exchanger (condenser tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Raw water	Reduction of heat transfer	Open-Cycle Cooling Water System (B.2.32)	VII.C1-6 (A-72)	3.3.1-83	A
69	Heat exchanger (condenser tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Gas-EXT	None	None	VII.J-4 (AP-9)	3.3.1-97	C
70	Heat exchanger (plenum)	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
71	Heat exchanger (plenum)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-8 (AP-41)	3.3.1-59	A
72	Heat exchanger (plenum)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
73	Heat exchanger (tube)	Leakage boundary (spatial)	Copper alloy <15% Zn	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.F3-8 (AP-34)	3.3.1-51	A
74	Heat exchanger (tube)	Leakage boundary (spatial)	Copper alloy <15% Zn	Air with borated water leakage-EXT	None	None	VII.J-5 (AP-11)	3.3.1-99	C
75	Heat exchanger (tube)	Leakage boundary (spatial)	Copper alloy <15% Zn	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-14 (A-46)	3.3.1-25	E
76	Heat exchanger (tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.F3-8 (AP-34)	3.3.1-51	A
77	Heat exchanger (tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Closed cycle cooling water	Reduction of heat transfer	Closed-Cycle Cooling Water System (B.2.9)	VII.F2-10 (AP-80)	3.3.1-52	A
78	Heat exchanger (tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Gas	None	None	VII.J-4 (AP-9)	3.3.1-97	C

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
79	Heat exchanger (tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Raw water	Loss of material	Open-Cycle Cooling Water System (B.2.32)	VII.C1-3 (A-65)	3.3.1-82	A
80	Heat exchanger (tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Raw water	Reduction of heat transfer	Open-Cycle Cooling Water System (B.2.32)	VII.C1-6 (A-72)	3.3.1-83	A
81	Heat exchanger (tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Air with borated water leakage-EXT	None	None	VII.J-5 (AP-11)	3.3.1-99	A
82	Heat exchanger (tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Condensation -EXT	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F2-14 (A-46)	3.3.1-25	E
83	Heat exchanger (tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Condensation -EXT	Reduction of heat transfer	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	N/A	N/A	H

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
84	Heat exchanger (tube)	Pressure boundary and Heat transfer	Stainless steel	Raw water	Loss of material	Open-Cycle Cooling Water System (B.2.32)	VII.C1-15 (A-54)	3.3.1-79	C
85	Heat exchanger (tube)	Pressure boundary and Heat transfer	Stainless steel	Raw water	Reduction of heat transfer	Open-Cycle Cooling Water System (B.2.32)	VII.C1-7 (AP-61)	3.3.1-83	A
86	Heat exchanger (tube)	Pressure boundary and Heat transfer	Stainless steel	Condensation -EXT	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F2-1 (A-09)	3.3.1-27	E
87	Heat exchanger (tube)	Pressure boundary and Heat transfer	Stainless steel	Condensation -EXT	Reduction of heat transfer	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	N/A	N/A	G
88	Heat exchanger (Unit 1 SWGR cooler tube / channel)	Leakage boundary (spatial)	Copper alloy <15% Zn	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.F3-8 (AP-34)	3.3.1-51	A

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
89	Heat exchanger (Unit 1 SWGR cooler tube / channel)	Leakage boundary (spatial)	Copper alloy <15% Zn	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-14 (A-46)	3.3.1-25	E
90	Heat exchanger (Unit 1 switchgear cooler channel)	Leakage boundary (spatial)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.F2-9 (A-63)	3.3.1-48	A
91	Heat exchanger (Unit 1 switchgear cooler channel)	Leakage boundary (spatial)	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A
92	Isokinetic nozzle	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
93	Isokinetic nozzle	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
94	Isokinetic nozzle	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
95	Orifice	Pressure boundary and Flow restriction	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
96	Orifice	Pressure boundary and Flow restriction	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-2 (A-10)	3.3.1-56	A
97	Orifice	Pressure boundary and Flow restriction	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
98	Orifice	Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
99	Orifice	Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-2 (A-10)	3.3.1-56	A

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
100	Orifice	Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
101	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
102	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F2-1 (A-09)	3.3.1-27	E
103	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
104	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
105	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
106	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F2-3 (A-08)	3.3.1-72	A

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
107	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-2 (A-10)	3.3.1-56	A
108	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
109	Piping	Pressure boundary	Copper alloy <15% Zn	Gas	None	None	VII.J-4 (AP-9)	3.3.1-97	A
110	Piping	Pressure boundary	Copper alloy <15% Zn	Air with borated water leakage-EXT	None	None	VII.J-5 (AP-11)	3.3.1-99	A
111	Piping	Pressure boundary	Copper alloy <15% Zn	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-14 (A-46)	3.3.1-25	E

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
112	Piping	Pressure boundary	Steel	Gas	None	None	VII.J-23 (AP-6)	3.3.1-97	A
113	Piping	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
114	Piping	Pressure boundary	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A
115	Piping (used as duct)	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
116	Piping (used as duct)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
117	Piping (used as duct)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
118	Piping (used as duct)	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
119	Piping (used as duct)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-2 (A-10)	3.3.1-56	A
120	Piping (used as duct)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
121	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Gas	None	None	VII.J-4 (AP-9)	3.3.1-97	A
122	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	A

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
123	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-14 (A-46)	3.3.1-25	E
124	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Condensation -EXT	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	N/A	N/A	H
125	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
126	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
127	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
128	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F2-3 (A-08)	3.3.1-72	A

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
129	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-2 (A-10)	3.3.1-56	A
130	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
131	Valve body	Pressure boundary	Copper alloy >15% Zn	Gas	None	None	VII.J-4 (AP-9)	3.3.1-97	A
132	Valve body	Pressure boundary	Copper alloy >15% Zn	Condensation -EXT	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	N/A	N/A	H
133	Valve body	Pressure boundary	Copper alloy >15% Zn	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-14 (A-46)	3.3.1-25	E

Table 3.3.2-2 (continued): Area Ventilation System—Plant Areas

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
134	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
135	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
136	Valve body	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
137	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
138	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-2 (A-10)	3.3.1-56	A
139	Valve body	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-3
Auxiliary Systems –
Boron Recovery and Primary Grade Water System –
Summary of Aging Management Evaluation

Table 3.3.2-3 : Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
2	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
3	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
4	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
5	Bolting	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
6	Bolting	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
7	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
8	Bolting	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
9	Expansion joint	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A
10	Expansion joint	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
11	Expansion joint	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
12	Expansion joint	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
13	Filter housing	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
14	Filter housing	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
15	Filter housing	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
16	Filter housing	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
17	Filter housing	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
18	Filter housing	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
19	Filter housing	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
20	Flexible hose	Leakage boundary (spatial)	Nickel alloy	Gas	None	None	VII.J-19 (AP-22)	3.3.1-97	A, 302
21	Flexible hose	Leakage boundary (spatial)	Nickel alloy	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A, 302

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
22	Flexible hose	Leakage boundary (spatial)	Nickel alloy	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A, 302
23	Flexible hose	Leakage boundary (spatial)	Nickel alloy	Air - indoor uncontrolled-EXT	None	None	VII.J-14 (AP-16)	3.3.1-94	A
24	Flexible hose	Leakage boundary (spatial)	Nickel alloy	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A, 302
25	Flexible hose	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
26	Flexible hose	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
27	Flexible hose	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
28	Flexible hose	Pressure boundary	Nickel alloy	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A, 302

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
29	Flexible hose	Pressure boundary	Nickel alloy	Air - indoor uncontrolled-EXT	None	None	VII.J-14 (AP-16)	3.3.1-94	A
30	Flexible hose	Pressure boundary	Nickel alloy	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A, 302
31	Heat exchanger (channel)	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
32	Heat exchanger (channel)	Leakage boundary (spatial)	Stainless steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-10 (A-52)	3.3.1-50	C
33	Heat exchanger (channel)	Leakage boundary (spatial)	Stainless steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-15 (A-54)	3.3.1-79	E, 315
34	Heat exchanger (channel)	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
35	Heat exchanger (channel)	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	One-Time Inspection (B.2.30)	VII.E1-5 (A-84)	3.3.1-08	E
36	Heat exchanger (channel)	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-5 (A-84)	3.3.1-08	A
37	Heat exchanger (channel)	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
38	Heat exchanger (channel)	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
39	Heat exchanger (channel)	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
40	Heat exchanger (channel)	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
41	Heat exchanger (channel)	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
42	Heat exchanger (channel)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	One-Time Inspection (B.2.30)	VII.E1-5 (A-84)	3.3.1-08	E
43	Heat exchanger (channel)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-5 (A-84)	3.3.1-08	A
44	Heat exchanger (channel)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
45	Heat exchanger (channel)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
46	Heat exchanger (channel)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
47	Heat exchanger (shell)	Leakage boundary (spatial)	Stainless steel	Gas	None	None	VII.J-19 (AP-22)	3.3.1-97	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
48	Heat exchanger (shell)	Leakage boundary (spatial)	Stainless steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-15 (A-54)	3.3.1-79	E, 315
49	Heat exchanger (shell)	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	One-Time Inspection (B.2.30)	VII.E1-5 (A-84)	3.3.1-08	E
50	Heat exchanger (shell)	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-5 (A-84)	3.3.1-08	A
51	Heat exchanger (shell)	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
52	Heat exchanger (shell)	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
53	Heat exchanger (shell)	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
54	Heat exchanger (shell)	Leakage boundary (spatial)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-1 (A-63)	3.3.1-48	A
55	Heat exchanger (shell)	Leakage boundary (spatial)	Steel	Treated water	Loss of material	Flow-Accelerated Corrosion (B.2.18)	VIII.E-35 (S-16)	3.4.1-29	A
56	Heat exchanger (shell)	Leakage boundary (spatial)	Steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-18 (A-35)	3.3.1-17	C, 305
57	Heat exchanger (shell)	Leakage boundary (spatial)	Steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-18 (A-35)	3.3.1-17	C, 305
58	Heat exchanger (shell)	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
59	Heat exchanger (shell)	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
60	Heat exchanger (shell)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	One-Time Inspection (B.2.30)	VII.E1-5 (A-84)	3.3.1-08	E

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
61	Heat exchanger (shell)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-5 (A-84)	3.3.1-08	A
62	Heat exchanger (shell)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
63	Heat exchanger (shell)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
64	Heat exchanger (shell)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
65	Heat exchanger (shell)	Pressure boundary	Steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-18 (A-35)	3.3.1-17	C, 305
66	Heat exchanger (shell)	Pressure boundary	Steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-18 (A-35)	3.3.1-17	C, 305
67	Heat exchanger (shell)	Pressure boundary	Steel	Treated water	Loss of material	Flow-Accelerated Corrosion (B.2.18)	VIII.E-35 (S-16)	3.4.1-29	A
68	Heat exchanger (shell)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
69	Heat exchanger (shell)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
70	Heat exchanger (tube / tubesheet)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	One-Time Inspection (B.2.30)	VII.E1-5 (A-84)	3.3.1-08	E
71	Heat exchanger (tube / tubesheet)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-5 (A-84)	3.3.1-08	A
72	Heat exchanger (tube / tubesheet)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
73	Heat exchanger (tube / tubesheet)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)-EXT	Cracking	One-Time Inspection (B.2.30)	VII.E1-5 (A-84)	3.3.1-08	E
74	Heat exchanger (tube / tubesheet)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)-EXT	Cracking	Water Chemistry (B.2.42)	VII.E1-5 (A-84)	3.3.1-08	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
75	Heat exchanger (tube / tubesheet)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)-EXT	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
76	Heat exchanger (tube / tubesheet)	Pressure boundary	Stainless steel	Treated water >60°C (>140°F)-EXT	Cracking	One-Time Inspection (B.2.30)	VII.E3-19 (A-85)	3.3.1-05	E, 305
77	Heat exchanger (tube / tubesheet)	Pressure boundary	Stainless steel	Treated water >60°C (>140°F)-EXT	Cracking	Water Chemistry (B.2.42)	VII.E3-19 (A-85)	3.3.1-05	E, 305
78	Heat exchanger (tube / tubesheet)	Pressure boundary	Stainless steel	Treated water >60°C (>140°F)-EXT	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
79	Heat exchanger (tube / tubesheet)	Pressure boundary	Stainless steel	Treated water >60°C (>140°F)-EXT	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
80	Orifice	Leakage boundary (spatial)	Stainless steel	Gas	None	None	VII.J-19 (AP-22)	3.3.1-97	A
81	Orifice	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
82	Orifice	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A
83	Orifice	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
84	Orifice	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
85	Orifice	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
86	Orifice	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
87	Orifice	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
88	Orifice	Pressure boundary and Flow restriction	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
89	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
90	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
91	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy <15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304
92	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
93	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy <15% Zn	Air with borated water leakage-EXT	None	None	VII.J-5 (AP-11)	3.3.1-99	A
94	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
95	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Gas	None	None	VII.J-19 (AP-22)	3.3.1-97	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
96	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
97	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A
98	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
99	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
100	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
101	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
102	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
103	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
104	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-14 (A-25)	3.3.1-47	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
105	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 315
106	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
107	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
108	Piping	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
109	Piping	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A
110	Piping	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
111	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
112	Piping	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
113	Piping (fitting)	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
114	Piping (fitting)	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-9 (A-44)	3.3.1-81	E, 315
115	Piping (fitting)	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C1-10 (A-47)	3.3.1-84	B
116	Piping (fitting)	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
117	Piping (fitting)	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	A
118	Pump casing	Leakage boundary (spatial)	Cast austenitic stainless steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-15 (A-54)	3.3.1-79	E, 315
119	Pump casing	Leakage boundary (spatial)	Cast austenitic stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
120	Pump casing	Leakage boundary (spatial)	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A
121	Pump casing	Leakage boundary (spatial)	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
122	Pump casing	Leakage boundary (spatial)	Cast austenitic stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
123	Pump casing	Leakage boundary (spatial)	Cast austenitic stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
124	Pump casing	Leakage boundary (spatial)	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
125	Pump casing	Leakage boundary (spatial)	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
126	Pump casing	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A
127	Pump casing	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
128	Pump casing	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
129	Pump casing	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
130	Pump casing	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
131	Pump casing	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
132	Pump casing	Leakage boundary (spatial)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-14 (A-25)	3.3.1-47	A
133	Pump casing	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
134	Pump casing	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
135	Sight glass	Leakage boundary (spatial)	Glass	Air - indoor uncontrolled	None	None	VII.J-8 (AP-14)	3.3.1-93	A, 304
136	Sight glass	Leakage boundary (spatial)	Glass	Raw water	None	None	VII.J-11 (AP-50)	3.3.1-93	A
137	Sight glass	Leakage boundary (spatial)	Glass	Treated water	None	None	VII.J-13 (AP-51)	3.3.1-93	A
138	Sight glass	Leakage boundary (spatial)	Glass	Air - indoor uncontrolled-EXT	None	None	VII.J-8 (AP-14)	3.3.1-93	A
139	Sight glass	Leakage boundary (spatial)	Glass	Air with borated water leakage-EXT	None	None	N/A	N/A	G
140	Strainer body	Leakage boundary (spatial)	Copper alloy >15% Zn	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-9 (A-44)	3.3.1-81	E, 315
141	Strainer body	Leakage boundary (spatial)	Copper alloy >15% Zn	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C1-10 (A-47)	3.3.1-84	B

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
142	Strainer body	Leakage boundary (spatial)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
143	Strainer body	Leakage boundary (spatial)	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	A
144	Strainer body	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
145	Strainer body	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A
146	Strainer body	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
147	Strainer body	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
148	Strainer body	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
149	Strainer body	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
150	Strainer body	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
151	Tank	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
152	Tank	Leakage boundary (spatial)	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F2-1 (A-09)	3.3.1-27	E
153	Tank	Leakage boundary (spatial)	Stainless steel	Gas	None	None	VII.J-19 (AP-22)	3.3.1-97	A
154	Tank	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
155	Tank	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A
156	Tank	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
157	Tank	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
158	Tank	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
159	Tank	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
160	Tank	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
161	Tank	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
162	Tank	Leakage boundary (spatial)	Steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 315
163	Tank	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
164	Tank	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
165	Tubing	Leakage boundary (spatial)	Stainless steel	Gas	None	None	VII.J-19 (AP-22)	3.3.1-97	A
166	Tubing	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
167	Tubing	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A
168	Tubing	Leakage boundary (spatial)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
169	Tubing	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
170	Tubing	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
171	Tubing	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
172	Tubing	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
173	Tubing	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
174	Tubing	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
175	Tubing	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
176	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304
177	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-9 (A-44)	3.3.1-81	E, 315

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
178	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C1-10 (A-47)	3.3.1-84	B
179	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
180	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
181	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Gas	None	None	VII.J-19 (AP-22)	3.3.1-97	A
182	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
183	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
184	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
185	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
186	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
187	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
188	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
189	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-14 (A-25)	3.3.1-47	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
190	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 315
191	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
192	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
193	Valve body	Pressure boundary	Cast austenitic stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
194	Valve body	Pressure boundary	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A
195	Valve body	Pressure boundary	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
196	Valve body	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
197	Valve body	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
198	Valve body	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
199	Valve body	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
200	Valve body	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
201	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
202	Valve body	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
203	Valve body (RV outlet plenum)	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
204	Valve body (RV outlet plenum)	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-3 (continued): Boron Recovery and Primary Grade Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
205	Valve body (RV outlet plenum)	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-4
Auxiliary Systems –
Building and Yard Drains System –
Summary of Aging Management Evaluation

Table 3.3.2-4 : Building and Yard Drains System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Bolting	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
2	Bolting	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
3	Bolting	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
4	Bolting	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
5	Expansion joint	Leakage boundary (spatial)	Copper alloy >15% Zn	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-9 (A-44)	3.3.1-81	E, 316

Table 3.3.2-4 (continued): Building and Yard Drains System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
6	Expansion joint	Leakage boundary (spatial)	Copper alloy >15% Zn	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C1-10 (A-47)	3.3.1-84	B
7	Expansion joint	Leakage boundary (spatial)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
8	Flow controller	Leakage boundary (spatial)	Steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 316
9	Flow controller	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
10	Flow controller	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
11	Oil interceptor	Leakage boundary (spatial)	Steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 316

Table 3.3.2-4 (continued): Building and Yard Drains System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
12	Oil interceptor	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
13	Oil interceptor	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
14	Piping	Leakage boundary (spatial)	Copper alloy >15% Zn	Condensation	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	N/A	N/A	G
15	Piping	Leakage boundary (spatial)	Copper alloy >15% Zn	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-9 (AP-78)	3.3.1-28	E
16	Piping	Leakage boundary (spatial)	Copper alloy >15% Zn	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C1-10 (A-47)	3.3.1-84	B
17	Piping	Leakage boundary (spatial)	Copper alloy >15% Zn	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-9 (A-44)	3.3.1-81	E, 316

Table 3.3.2-4 (continued): Building and Yard Drains System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
18	Piping	Leakage boundary (spatial)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
19	Piping	Leakage boundary (spatial)	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	A
20	Piping	Leakage boundary (spatial)	Gray cast iron	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 316
21	Piping	Leakage boundary (spatial)	Gray cast iron	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C1-11 (A-51)	3.3.1-85	B
22	Piping	Leakage boundary (spatial)	Gray cast iron	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
23	Piping	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304

Table 3.3.2-4 (continued): Building and Yard Drains System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
24	Piping	Leakage boundary (spatial)	Stainless steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-15 (A-54)	3.3.1-79	E, 316
25	Piping	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
26	Piping	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
27	Piping	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
28	Piping	Leakage boundary (spatial)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.H2-21 (A-23)	3.3.1-71	A

Table 3.3.2-4 (continued): Building and Yard Drains System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
29	Piping	Leakage boundary (spatial)	Steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 316
30	Piping	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
31	Piping	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
32	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
33	Piping	Pressure boundary	Stainless steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-15 (A-54)	3.3.1-79	E, 316
34	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A

Table 3.3.2-4 (continued): Building and Yard Drains System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
35	Piping	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
36	Pump casing	Leakage boundary (spatial)	Gray cast iron	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 316
37	Pump casing	Leakage boundary (spatial)	Gray cast iron	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C1-11 (A-51)	3.3.1-85	B
38	Pump casing	Leakage boundary (spatial)	Gray cast iron	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
39	Pump casing	Leakage boundary (spatial)	Gray cast iron	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
40	Pump casing	Leakage boundary (spatial)	Steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 316

Table 3.3.2-4 (continued): Building and Yard Drains System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
41	Pump casing	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
42	Pump casing	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
43	Sight glass	Leakage boundary (spatial)	Glass	Condensation	None	None	N/A	N/A	G
44	Sight glass	Leakage boundary (spatial)	Glass	Raw water	None	None	VII.J-11 (AP-50)	3.3.1-93	A
45	Sight glass	Leakage boundary (spatial)	Glass	Air - indoor uncontrolled-EXT	None	None	VII.J-8 (AP-14)	3.3.1-93	A
46	Sight glass	Leakage boundary (spatial)	Glass	Air with borated water leakage-EXT	None	None	N/A	N/A	G
47	Tank	Leakage boundary (spatial)	Gray cast iron	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.H2-21 (A-23)	3.3.1-71	A

Table 3.3.2-4 (continued): Building and Yard Drains System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
48	Tank	Leakage boundary (spatial)	Gray cast iron	Condensation	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	N/A	N/A	G
49	Tank	Leakage boundary (spatial)	Gray cast iron	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 316
50	Tank	Leakage boundary (spatial)	Gray cast iron	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C1-11 (A-51)	3.3.1-85	B
51	Tank	Leakage boundary (spatial)	Gray cast iron	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
52	Tank	Leakage boundary (spatial)	Gray cast iron	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
53	Valve body	Leakage boundary (spatial)	Copper alloy >15% Zn	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-9 (AP-78)	3.3.1-28	E

Table 3.3.2-4 (continued): Building and Yard Drains System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
54	Valve body	Leakage boundary (spatial)	Copper alloy >15% Zn	Condensation	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	N/A	N/A	G
55	Valve body	Leakage boundary (spatial)	Copper alloy >15% Zn	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-9 (A-44)	3.3.1-81	E, 316
56	Valve body	Leakage boundary (spatial)	Copper alloy >15% Zn	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C1-10 (A-47)	3.3.1-84	B
57	Valve body	Leakage boundary (spatial)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
58	Valve body	Leakage boundary (spatial)	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	A
59	Valve body	Leakage boundary (spatial)	Gray cast iron	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 316

Table 3.3.2-4 (continued): Building and Yard Drains System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
60	Valve body	Leakage boundary (spatial)	Gray cast iron	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C1-11 (A-51)	3.3.1-85	B
61	Valve body	Leakage boundary (spatial)	Gray cast iron	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
62	Valve body	Leakage boundary (spatial)	Stainless steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-15 (A-54)	3.3.1-79	E, 316
63	Valve body	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
64	Valve body	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
65	Valve body	Leakage boundary (spatial)	Steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 316

Table 3.3.2-4 (continued): Building and Yard Drains System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
66	Valve body	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
67	Valve body	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-5
Auxiliary Systems –
Chemical and Volume Control System –
Summary of Aging Management Evaluation

Table 3.3.2-5 : Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Blender body	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
2	Blender body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
3	Blender body	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
4	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	Cumulative fatigue damage	TLAA	N/A	N/A	H

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
5	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
6	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
7	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Cumulative fatigue damage	TLAA	VII.E1-18 (A-34)	3.3.1-02	C

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
8	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
9	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
10	Bolting	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	Cumulative fatigue damage	TLAA	N/A	N/A	H
11	Bolting	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
12	Bolting	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
13	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Cumulative fatigue damage	TLAA	VII.E1-18 (A-34)	3.3.1-02	C
14	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
15	Bolting	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
16	Demineralizer	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
17	Demineralizer	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
18	Demineralizer	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
19	Demineralizer	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
20	Demineralizer	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
21	Demineralizer	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
22	Filter housing	Pressure boundary	Gray cast iron	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-19 (AP-30)	3.3.1-14	A
23	Filter housing	Pressure boundary	Gray cast iron	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-19 (AP-30)	3.3.1-14	A
24	Filter housing	Pressure boundary	Gray cast iron	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
25	Filter housing	Pressure boundary	Gray cast iron	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.E1-1 (A-79)	3.3.1-89	A
26	Filter housing	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
27	Filter housing	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
28	Filter housing	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
29	Filter housing	Pressure boundary	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-19 (AP-30)	3.3.1-14	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
30	Filter housing	Pressure boundary	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-19 (AP-30)	3.3.1-14	A
31	Filter housing	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
32	Filter housing	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.E1-1 (A-79)	3.3.1-89	A
33	Flexible hose	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
34	Flexible hose	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
35	Flexible hose	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
36	Flexible hose	Pressure boundary	Nickel alloy	Gas	None	None	VII.J-19 (AP-22)	3.3.1-97	A, 302
37	Flexible hose	Pressure boundary	Nickel alloy	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A, 302

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
38	Flexible hose	Pressure boundary	Nickel alloy	Air - indoor uncontrolled-EXT	None	None	VII.J-14 (AP-16)	3.3.1-94	A
39	Flexible hose	Pressure boundary	Nickel alloy	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A, 302
40	Flexible hose	Pressure boundary	Stainless steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-15 (AP-59)	3.3.1-33	A
41	Flexible hose	Pressure boundary	Stainless steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-15 (AP-59)	3.3.1-33	A
42	Flexible hose	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
43	Flexible hose	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
44	Gearbox	Pressure boundary	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-19 (AP-30)	3.3.1-14	C
45	Gearbox	Pressure boundary	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-19 (AP-30)	3.3.1-14	C
46	Gearbox	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
47	Gearbox	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.E1-1 (A-79)	3.3.1-89	A
48	Heat exchanger (excess letdown, seal water - channel)	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
49	Heat exchanger (excess letdown, seal water - channel)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
50	Heat exchanger (excess letdown, seal water - channel)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
51	Heat exchanger (excess letdown, seal water - shell)	Pressure boundary	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.E1-6 (A-63)	3.3.1-48	A
52	Heat exchanger (excess letdown, seal water - shell)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
53	Heat exchanger (excess letdown, seal water - shell)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.E1-1 (A-79)	3.3.1-89	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
54	Heat exchanger (excess letdown, seal water - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
55	Heat exchanger (excess letdown, seal water - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water	Reduction of heat transfer	One-Time Inspection (B.2.30)	N/A	N/A	H
56	Heat exchanger (excess letdown, seal water - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water	Reduction of heat transfer	Water Chemistry (B.2.42)	N/A	N/A	H
57	Heat exchanger (excess letdown, seal water - tube)	Pressure boundary and Heat transfer	Stainless steel	Closed cycle cooling water-EXT	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-10 (A-52)	3.3.1-50	C
58	Heat exchanger (excess letdown, seal water - tube)	Pressure boundary and Heat transfer	Stainless steel	Closed cycle cooling water-EXT	Reduction of heat transfer	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-3 (AP-63)	3.3.1-52	A
59	Heat exchanger (excess letdown, seal water - tubesheet)	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C

Table 3.3.2-5 (continued): Chemical and Volume Control System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
60	Heat exchanger (excess letdown, seal water - tubesheet)	Pressure boundary	Stainless steel	Closed cycle cooling water-EXT	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-10 (A-52)	3.3.1-50	C
61	Heat exchanger (oil cooler - channel)	Pressure boundary	Cast austenitic stainless steel	Raw water	Loss of material	Open-Cycle Cooling Water System (B.2.32)	VII.C1-15 (A-54)	3.3.1-79	C
62	Heat exchanger (oil cooler - channel)	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
63	Heat exchanger (oil cooler - channel)	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
64	Heat exchanger (oil cooler - shell)	Pressure boundary	Stainless steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-15 (AP-59)	3.3.1-33	C
65	Heat exchanger (oil cooler - shell)	Pressure boundary	Stainless steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-15 (AP-59)	3.3.1-33	C
66	Heat exchanger (oil cooler - shell)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
67	Heat exchanger (oil cooler - shell)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
68	Heat exchanger (oil cooler - tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Raw water	Loss of material	Open-Cycle Cooling Water System (B.2.32)	VII.C1-3 (A-65)	3.3.1-82	A
69	Heat exchanger (oil cooler - tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Raw water	Reduction of heat transfer	Open-Cycle Cooling Water System (B.2.32)	VII.C1-6 (A-72)	3.3.1-83	A
70	Heat exchanger (oil cooler - tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Lubricating oil-EXT	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-12 (AP-47)	3.3.1-26	C
71	Heat exchanger (oil cooler - tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Lubricating oil-EXT	Loss of material	One-Time Inspection (B.2.30)	VII.E1-12 (AP-47)	3.3.1-26	C
72	Heat exchanger (oil cooler - tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Lubricating oil-EXT	Reduction of heat transfer	Lubricating Oil Analysis (B.2.24)	N/A	N/A	H

Table 3.3.2-5 (continued): Chemical and Volume Control System									
Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
73	Heat exchanger (oil cooler - tube)	Pressure boundary and Heat transfer	Copper alloy <15% Zn	Lubricating oil-EXT	Reduction of heat transfer	One-Time Inspection (B.2.30)	N/A	N/A	H
74	Heat exchanger (oil cooler - tubesheet)	Pressure boundary	Cast austenitic stainless steel	Raw water	Loss of material	Open-Cycle Cooling Water System (B.2.32)	VII.C1-15 (A-54)	3.3.1-79	C
75	Heat exchanger (oil cooler - tubesheet)	Pressure boundary	Cast austenitic stainless steel	Lubricating oil-EXT	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-15 (AP-59)	3.3.1-33	C
76	Heat exchanger (oil cooler - tubesheet)	Pressure boundary	Cast austenitic stainless steel	Lubricating oil-EXT	Loss of material	One-Time Inspection (B.2.30)	VII.E1-15 (AP-59)	3.3.1-33	C
77	Heat exchanger (Unit 1 batch tank - jacket)	Leakage boundary (spatial)	Steel	Treated water	Loss of material	Flow-Accelerated Corrosion (B.2.18)	VIII.E-35 (S-16)	3.4.1-29	A
78	Heat exchanger (Unit 1 batch tank - jacket)	Leakage boundary (spatial)	Steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-18 (A-35)	3.3.1-17	C, 305

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
79	Heat exchanger (Unit 1 batch tank - jacket)	Leakage boundary (spatial)	Steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-18 (A-35)	3.3.1-17	C, 305
80	Heat exchanger (Unit 1 batch tank - jacket)	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
81	Heat exchanger (Unit 1 batch tank - jacket)	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.E1-1 (A-79)	3.3.1-89	A
82	Heat exchanger (Unit 1 non-regen - channel)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	One-Time Inspection (B.2.30)	VII.E1-9 (A-69)	3.3.1-07	A
83	Heat exchanger (Unit 1 non-regen - channel)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-9 (A-69)	3.3.1-07	A
84	Heat exchanger (Unit 1 non-regen - channel)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
85	Heat exchanger (Unit 1 non-regen - channel)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
86	Heat exchanger (Unit 1 non-regen - shell)	Pressure boundary	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.E1-6 (A-63)	3.3.1-48	A
87	Heat exchanger (Unit 1 non-regen - shell)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
88	Heat exchanger (Unit 1 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-9 (A-69)	3.3.1-07	A
89	Heat exchanger (Unit 1 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	One-Time Inspection (B.2.30)	VII.E1-9 (A-69)	3.3.1-07	A
90	Heat exchanger (Unit 1 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
91	Heat exchanger (Unit 1 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Reduction of heat transfer	One-Time Inspection (B.2.30)	N/A	N/A	H

Table 3.3.2-5 (continued): Chemical and Volume Control System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
92	Heat exchanger (Unit 1 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Reduction of heat transfer	Water Chemistry (B.2.42)	N/A	N/A	H
93	Heat exchanger (Unit 1 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Closed cycle cooling water >60°C (>140°F)-EXT	Cracking	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-11 (AP-60)	3.3.1-46	C
94	Heat exchanger (Unit 1 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Closed cycle cooling water >60°C (>140°F)-EXT	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-10 (A-52)	3.3.1-50	C
95	Heat exchanger (Unit 1 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Closed cycle cooling water >60°C (>140°F)-EXT	Reduction of heat transfer	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-3 (AP-63)	3.3.1-52	A
96	Heat exchanger (Unit 1 non-regen - tubesheet)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	One-Time Inspection (B.2.30)	VII.E1-9 (A-69)	3.3.1-07	A
97	Heat exchanger (Unit 1 non-regen - tubesheet)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-9 (A-69)	3.3.1-07	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
98	Heat exchanger (Unit 1 non-regen - tubesheet)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
99	Heat exchanger (Unit 1 non-regen - tubesheet)	Pressure boundary	Stainless steel	Closed cycle cooling water >60°C (>140°F)-EXT	Cracking	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-11 (AP-60)	3.3.1-46	C
100	Heat exchanger (Unit 1 non-regen - tubesheet)	Pressure boundary	Stainless steel	Closed cycle cooling water >60°C (>140°F)-EXT	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-10 (A-52)	3.3.1-50	C
101	Heat exchanger (Unit 2 batch tank - jacket)	Leakage boundary (spatial)	Stainless steel	Treated water >60°C (>140°F)	Cracking	One-Time Inspection (B.2.30)	VII.E4-15 (A-61)	3.3.1-38	E, 305
102	Heat exchanger (Unit 2 batch tank - jacket)	Leakage boundary (spatial)	Stainless steel	Treated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E4-15 (A-61)	3.3.1-38	E, 305
103	Heat exchanger (Unit 2 batch tank - jacket)	Leakage boundary (spatial)	Stainless steel	Treated water >60°C (>140°F)	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
104	Heat exchanger (Unit 2 batch tank - jacket)	Leakage boundary (spatial)	Stainless steel	Treated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
105	Heat exchanger (Unit 2 batch tank - jacket)	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
106	Heat exchanger (Unit 2 batch tank - jacket)	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
107	Heat exchanger (Unit 2 non-regen - channel)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-9 (A-69)	3.3.1-07	A
108	Heat exchanger (Unit 2 non-regen - channel)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	One-Time Inspection (B.2.30)	VII.E1-9 (A-69)	3.3.1-07	A
109	Heat exchanger (Unit 2 non-regen - channel)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	VII.E1-4 (A-100)	3.3.1-02	A
110	Heat exchanger (Unit 2 non-regen - channel)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
111	Heat exchanger (Unit 2 non-regen - channel)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
112	Heat exchanger (Unit 2 non-regen - shell)	Pressure boundary	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.E1-6 (A-63)	3.3.1-48	A
113	Heat exchanger (Unit 2 non-regen - shell)	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.E1-1 (A-79)	3.3.1-89	A
114	Heat exchanger (Unit 2 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-9 (A-69)	3.3.1-07	A
115	Heat exchanger (Unit 2 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	One-Time Inspection (B.2.30)	VII.E1-9 (A-69)	3.3.1-07	A
116	Heat exchanger (Unit 2 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	VII.E1-4 (A-100)	3.3.1-02	A

Table 3.3.2-5 (continued): Chemical and Volume Control System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
117	Heat exchanger (Unit 2 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
118	Heat exchanger (Unit 2 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Reduction of heat transfer	One-Time Inspection (B.2.30)	N/A	N/A	H
119	Heat exchanger (Unit 2 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Reduction of heat transfer	Water Chemistry (B.2.42)	N/A	N/A	H
120	Heat exchanger (Unit 2 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Closed cycle cooling water >60°C (>140°F)-EXT	Cracking	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-11 (AP-60)	3.3.1-46	C
121	Heat exchanger (Unit 2 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Closed cycle cooling water >60°C (>140°F)-EXT	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-10 (A-52)	3.3.1-50	C
122	Heat exchanger (Unit 2 non-regen - tube)	Pressure boundary and Heat transfer	Stainless steel	Closed cycle cooling water >60°C (>140°F)-EXT	Reduction of heat transfer	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-3 (AP-63)	3.3.1-52	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
123	Heat exchanger (Unit 2 non-regen - tubesheet)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-9 (A-69)	3.3.1-07	A
124	Heat exchanger (Unit 2 non-regen - tubesheet)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	One-Time Inspection (B.2.30)	VII.E1-9 (A-69)	3.3.1-07	A
125	Heat exchanger (Unit 2 non-regen - tubesheet)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	VII.E1-4 (A-100)	3.3.1-02	A
126	Heat exchanger (Unit 2 non-regen - tubesheet)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
127	Heat exchanger (Unit 2 non-regen - tubesheet)	Pressure boundary	Stainless steel	Closed cycle cooling water >60°C (>140°F)-EXT	Cracking	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-11 (AP-60)	3.3.1-46	C
128	Heat exchanger (Unit 2 non-regen - tubesheet)	Pressure boundary	Stainless steel	Closed cycle cooling water >60°C (>140°F)-EXT	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-10 (A-52)	3.3.1-50	C

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
129	Heat exchanger (Unit 2 regen HX - channel)	Pressure boundary	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Cracking	One-Time Inspection (B.2.30)	VII.E1-5 (A-84)	3.3.1-08	E
130	Heat exchanger (Unit 2 regen HX - channel)	Pressure boundary	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-5 (A-84)	3.3.1-08	A
131	Heat exchanger (Unit 2 regen HX - channel)	Pressure boundary	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	VII.E1-4 (A-100)	3.3.1-02	A
132	Heat exchanger (Unit 2 regen HX - channel)	Pressure boundary	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
133	Heat exchanger (Unit 2 regen HX - channel)	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
134	Heat exchanger (Unit 2 regen HX - channel)	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
135	Heat exchanger (Unit 2 regen HX - shell)	Pressure boundary	Cast austenitic stainless steel	Treated borated water >250°C (>482°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-5 (A-84)	3.3.1-08	A
136	Heat exchanger (Unit 2 regen HX - shell)	Pressure boundary	Cast austenitic stainless steel	Treated borated water >250°C (>482°F)	Cracking	One-Time Inspection (B.2.30)	VII.E1-5 (A-84)	3.3.1-08	E
137	Heat exchanger (Unit 2 regen HX - shell)	Pressure boundary	Cast austenitic stainless steel	Treated borated water >250°C (>482°F)	Cumulative fatigue damage	TLAA	VII.E1-4 (A-100)	3.3.1-02	A
138	Heat exchanger (Unit 2 regen HX - shell)	Pressure boundary	Cast austenitic stainless steel	Treated borated water >250°C (>482°F)	Loss of fracture toughness	Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) (B.2.41)	V.D1-16 (E-47)	3.2.1-47	C
139	Heat exchanger (Unit 2 regen HX - shell)	Pressure boundary	Cast austenitic stainless steel	Treated borated water >250°C (>482°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
140	Heat exchanger (Unit 2 regen HX - shell)	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
141	Heat exchanger (Unit 2 regen HX - shell)	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
142	Heat exchanger (Unit 2 regen HX - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	One-Time Inspection (B.2.30)	VII.E1-5 (A-84)	3.3.1-08	E
143	Heat exchanger (Unit 2 regen HX - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-5 (A-84)	3.3.1-08	A
144	Heat exchanger (Unit 2 regen HX - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	VII.E1-4 (A-100)	3.3.1-02	A
145	Heat exchanger (Unit 2 regen HX - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C

Table 3.3.2-5 (continued): Chemical and Volume Control System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
146	Heat exchanger (Unit 2 regen HX - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Reduction of heat transfer	Water Chemistry (B.2.42)	N/A	N/A	H
147	Heat exchanger (Unit 2 regen HX - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)	Reduction of heat transfer	One-Time Inspection (B.2.30)	N/A	N/A	H
148	Heat exchanger (Unit 2 regen HX - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)-EXT	Cracking	One-Time Inspection (B.2.30)	VII.E1-5 (A-84)	3.3.1-08	E
149	Heat exchanger (Unit 2 regen HX - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)-EXT	Cracking	Water Chemistry (B.2.42)	VII.E1-5 (A-84)	3.3.1-08	A
150	Heat exchanger (Unit 2 regen HX - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)-EXT	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
151	Heat exchanger (Unit 2 regen HX - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)-EXT	Reduction of heat transfer	One-Time Inspection (B.2.30)	N/A	N/A	H

Table 3.3.2-5 (continued): Chemical and Volume Control System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
152	Heat exchanger (Unit 2 regen HX - tube)	Pressure boundary and Heat transfer	Stainless steel	Treated borated water >60°C (>140°F)-EXT	Reduction of heat transfer	Water Chemistry (B.2.42)	N/A	N/A	H
153	Heat exchanger (Unit 2 regen HX - tubesheet)	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
154	Heat exchanger (Unit 2 regen HX - tubesheet)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)-EXT	Cracking	Water Chemistry (B.2.42)	VII.E1-5 (A-84)	3.3.1-08	A
155	Heat exchanger (Unit 2 regen HX - tubesheet)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)-EXT	Cracking	One-Time Inspection (B.2.30)	VII.E1-5 (A-84)	3.3.1-08	E
156	Heat exchanger (Unit 2 regen HX - tubesheet)	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)-EXT	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	C
157	Orifice	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A

Table 3.3.2-5 (continued): Chemical and Volume Control System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
158	Orifice	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
159	Orifice	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
160	Orifice	Pressure boundary and Flow restriction	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
161	Orifice	Pressure boundary and Flow restriction	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A
162	Orifice	Pressure boundary and Flow restriction	Stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	VII.E1-16 (A-57)	3.3.1-02	A
163	Orifice	Pressure boundary and Flow restriction	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
164	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
165	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
166	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304
167	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A

Table 3.3.2-5 (continued): Chemical and Volume Control System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
168	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	A
169	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
170	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Gas	None	None	VII.J-19 (AP-22)	3.3.1-97	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
171	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
172	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
173	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
174	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-19 (AP-30)	3.3.1-14	A
175	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-19 (AP-30)	3.3.1-14	A
176	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
177	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.E1-1 (A-79)	3.3.1-89	A
178	Piping	Pressure boundary	Copper alloy >15% Zn	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-12 (AP-47)	3.3.1-26	A
179	Piping	Pressure boundary	Copper alloy >15% Zn	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-12 (AP-47)	3.3.1-26	A
180	Piping	Pressure boundary	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
181	Piping	Pressure boundary	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	A
182	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
183	Piping	Pressure boundary	Stainless steel	Gas	None	None	VII.J-19 (AP-22)	3.3.1-97	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
184	Piping	Pressure boundary	Stainless steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-15 (AP-59)	3.3.1-33	A
185	Piping	Pressure boundary	Stainless steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-15 (AP-59)	3.3.1-33	A
186	Piping	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
187	Piping	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A
188	Piping	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	VII.E1-16 (A-57)	3.3.1-02	A
189	Piping	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
190	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
191	Piping	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
192	Piping	Pressure boundary	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-19 (AP-30)	3.3.1-14	A
193	Piping	Pressure boundary	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-19 (AP-30)	3.3.1-14	A
194	Piping	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
195	Piping	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.E1-1 (A-79)	3.3.1-89	A
196	Pump casing (aux lube oil - Unit 1)	Leakage boundary (spatial)	Gray cast iron	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-19 (AP-30)	3.3.1-14	A
197	Pump casing (aux lube oil - Unit 1)	Leakage boundary (spatial)	Gray cast iron	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-19 (AP-30)	3.3.1-14	A
198	Pump casing (aux lube oil - Unit 1)	Leakage boundary (spatial)	Gray cast iron	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-5 (continued): Chemical and Volume Control System									
Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
199	Pump casing (aux lube oil - Unit 1)	Leakage boundary (spatial)	Gray cast iron	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.E1-1 (A-79)	3.3.1-89	A
200	Pump casing (aux lube oil - Unit 2)	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-19 (AP-30)	3.3.1-14	A
201	Pump casing (aux lube oil - Unit 2)	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-19 (AP-30)	3.3.1-14	A
202	Pump casing (aux lube oil - Unit 2)	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
203	Pump casing (aux lube oil - Unit 2)	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.E1-1 (A-79)	3.3.1-89	A
204	Pump casing (charging and boric acid)	Pressure boundary	Cast austenitic stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
205	Pump casing (charging and boric acid)	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A

Table 3.3.2-5 (continued): Chemical and Volume Control System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
206	Pump casing (charging and boric acid)	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
207	Pump casing (main lube oil)	Pressure boundary	Gray cast iron	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-19 (AP-30)	3.3.1-14	A
208	Pump casing (main lube oil)	Pressure boundary	Gray cast iron	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-19 (AP-30)	3.3.1-14	A
209	Pump casing (main lube oil)	Pressure boundary	Gray cast iron	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
210	Pump casing (main lube oil)	Pressure boundary	Gray cast iron	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.E1-1 (A-79)	3.3.1-89	A
211	Pump casing (zinc addition / recirc)	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
212	Pump casing (zinc addition / recirc)	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
213	Pump casing (zinc addition / recirc)	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
214	Pump casing (zinc addition / recirc)	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
215	Sight glass	Leakage boundary (spatial)	Elastomers	Air - indoor uncontrolled	Cracking	External Surfaces Monitoring (B.2.15)	N/A	N/A	H, 303
216	Sight glass	Leakage boundary (spatial)	Elastomers	Air - indoor uncontrolled	Hardening and Loss of strength	External Surfaces Monitoring (B.2.15)	VII.F2-7 (A-17)	3.3.1-11	E, 303
217	Sight glass	Leakage boundary (spatial)	Elastomers	Air - indoor uncontrolled-EXT	Cracking	External Surfaces Monitoring (B.2.15)	N/A	N/A	H
218	Sight glass	Leakage boundary (spatial)	Elastomers	Air - indoor uncontrolled-EXT	Hardening and Loss of strength	External Surfaces Monitoring (B.2.15)	VII.F2-7 (A-17)	3.3.1-11	E
219	Sight glass	Leakage boundary (spatial)	Elastomers	Air with borated water leakage-EXT	None	None	N/A	N/A	G
220	Sight glass	Leakage boundary (spatial)	Glass	Condensation	None	None	N/A	N/A	G

Table 3.3.2-5 (continued): Chemical and Volume Control System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
214	Pump casing (zinc addition / recirc)	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
215	Sight glass	Leakage boundary (spatial)	Elastomers	Air - indoor uncontrolled	Cracking	External Surfaces Monitoring (B.2.15)	N/A	N/A	H, 303
216	Sight glass	Leakage boundary (spatial)	Elastomers	Air - indoor uncontrolled	Hardening and Loss of strength	External Surfaces Monitoring (B.2.15)	VII.F2-7 (A-17)	3.3.1-11	E, 303
217	Sight glass	Leakage boundary (spatial)	Elastomers	Air - indoor uncontrolled-EXT	Cracking	External Surfaces Monitoring (B.2.15)	N/A	N/A	H
218	Sight glass	Leakage boundary (spatial)	Elastomers	Air - indoor uncontrolled-EXT	Hardening and Loss of strength	External Surfaces Monitoring (B.2.15)	VII.F2-7 (A-17)	3.3.1-11	E
219	Sight glass	Leakage boundary (spatial)	Elastomers	Air with borated water leakage-EXT	None	None	N/A	N/A	G
220	Sight glass	Leakage boundary (spatial)	Glass	Condensation	None	None	N/A	N/A	G

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
229	Sparger body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
230	Sparger body	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
231	Strainer body	Leakage boundary (spatial)	Cast austenitic stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
232	Strainer body	Leakage boundary (spatial)	Cast austenitic stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
233	Strainer body	Leakage boundary (spatial)	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
234	Strainer body	Leakage boundary (spatial)	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A

Table 3.3.2-5 (continued): Chemical and Volume Control System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
235	Strainer body	Pressure boundary	Cast austenitic stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
236	Strainer body	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
237	Strainer body	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
238	Strainer body	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
239	Strainer body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
240	Strainer body	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
241	Tank (boric acid batch)	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A

Table 3.3.2-5 (continued): Chemical and Volume Control System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
242	Tank (boric acid batch)	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
243	Tank (boric acid batch)	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
244	Tank (boric acid)	Pressure boundary	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F2-1 (A-09)	3.3.1-27	E
245	Tank (boric acid)	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
246	Tank (boric acid)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
247	Tank (boric acid)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
248	Tank (chem addition)	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
249	Tank (chem addition)	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
250	Tank (chem addition)	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
251	Tank (chem addition)	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
252	Tank (oil reservoir)	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
253	Tank (oil reservoir)	Pressure boundary	Stainless steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-15 (AP-59)	3.3.1-33	A
254	Tank (oil reservoir)	Pressure boundary	Stainless steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-15 (AP-59)	3.3.1-33	A
255	Tank (oil reservoir)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
256	Tank (oil reservoir)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
257	Tank (VCT)	Pressure boundary	Stainless steel	Gas	None	None	VII.J-19 (AP-22)	3.3.1-97	A

Table 3.3.2-5 (continued): Chemical and Volume Control System									
Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
258	Tank (VCT)	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
259	Tank (VCT)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
260	Tank (VCT)	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
261	Tank (zinc batch)	Leakage boundary (spatial)	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F2-1 (A-09)	3.3.1-27	E
262	Tank (zinc batch)	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
263	Tank (zinc batch)	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
264	Tank (zinc batch)	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
265	Tank (zinc batch)	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
266	Tubing	Leakage boundary (spatial)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
267	Tubing	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
268	Tubing	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
269	Tubing	Pressure boundary	Stainless steel	Gas	None	None	VII.J-19 (AP-22)	3.3.1-97	A
270	Tubing	Pressure boundary	Stainless steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-15 (AP-59)	3.3.1-33	A
271	Tubing	Pressure boundary	Stainless steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-15 (AP-59)	3.3.1-33	A
272	Tubing	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
273	Tubing	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A
274	Tubing	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
275	Tubing	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
276	Tubing	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
277	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
278	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
279	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	A
280	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Gas	None	None	VII.J-19 (AP-22)	3.3.1-97	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
281	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
282	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
283	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
284	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
285	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
286	Valve body	Pressure boundary	Cast austenitic stainless steel	Gas	None	None	VII.J-19 (AP-22)	3.3.1-97	A
287	Valve body	Pressure boundary	Cast austenitic stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A

Table 3.3.2-5 (continued): Chemical and Volume Control System									
Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
288	Valve body	Pressure boundary	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A
289	Valve body	Pressure boundary	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	VII.E1-16 (A-57)	3.3.1-02	A
290	Valve body	Pressure boundary	Cast austenitic stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
291	Valve body	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
292	Valve body	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
293	Valve body	Pressure boundary	Copper alloy >15% Zn	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-12 (AP-47)	3.3.1-26	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
294	Valve body	Pressure boundary	Copper alloy >15% Zn	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-12 (AP-47)	3.3.1-26	A
295	Valve body	Pressure boundary	Copper alloy >15% Zn	Lubricating oil-EXT	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-12 (AP-47)	3.3.1-26	A
296	Valve body	Pressure boundary	Copper alloy >15% Zn	Lubricating oil-EXT	Loss of material	One-Time Inspection (B.2.30)	VII.E1-12 (AP-47)	3.3.1-26	A
297	Valve body	Pressure boundary	Stainless steel	Gas	None	None	VII.J-19 (AP-22)	3.3.1-97	A
298	Valve body	Pressure boundary	Stainless steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-15 (AP-59)	3.3.1-33	A
299	Valve body	Pressure boundary	Stainless steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-15 (AP-59)	3.3.1-33	A
300	Valve body	Pressure boundary	Stainless steel	Treated borated water	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
301	Valve body	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cracking	Water Chemistry (B.2.42)	VII.E1-20 (AP-82)	3.3.1-90	A

Table 3.3.2-5 (continued): Chemical and Volume Control System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
302	Valve body	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Cumulative fatigue damage	TLAA	VII.E1-16 (A-57)	3.3.1-02	A
303	Valve body	Pressure boundary	Stainless steel	Treated borated water >60°C (>140°F)	Loss of material	Water Chemistry (B.2.42)	VII.E1-17 (AP-79)	3.3.1-91	A
304	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
305	Valve body	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
306	Valve body	Pressure boundary	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-19 (AP-30)	3.3.1-14	A
307	Valve body	Pressure boundary	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-19 (AP-30)	3.3.1-14	A
308	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-5 (continued): Chemical and Volume Control System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
309	Valve body	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.E1-1 (A-79)	3.3.1-89	A

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

Table 3.3.2-6 : Chilled Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
2	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A

Table 3.3.2-6 (continued): Chilled Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
3	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Condensation -EXT	Loss of material	Bolting Integrity (B.2.6)	VII.D-1 (A-103)	3.3.1-44	A
4	Bolting	Pressure boundary	High-strength steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
5	Bolting	Pressure boundary	High-strength steel	Air with steam or water leakage-EXT	Cracking	Bolting Integrity (B.2.6)	VII.I-3 (A-04)	3.3.1-41	A
6	Bolting	Pressure boundary	High-strength steel	Air with steam or water leakage-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-6 (A-03)	3.3.1-42	A
7	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
8	Bolting	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
9	Bolting	Pressure boundary	Steel	Condensation -EXT	Loss of material	Bolting Integrity (B.2.6)	VII.D-1 (A-103)	3.3.1-44	A

Table 3.3.2-6 (continued): Chilled Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
10	Heat exchanger (channel)	Leakage boundary (spatial)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-1 (A-63)	3.3.1-48	A
11	Heat exchanger (channel)	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
12	Heat exchanger (channel)	Leakage boundary (spatial)	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A
13	Heat exchanger (cooling coil)	Leakage boundary (spatial)	Copper alloy >15% Zn	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.F1-8 (AP-34)	3.3.1-51	A
14	Heat exchanger (cooling coil)	Leakage boundary (spatial)	Copper alloy >15% Zn	Closed cycle cooling water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C2-6 (AP-43)	3.3.1-84	D
15	Heat exchanger (cooling coil)	Leakage boundary (spatial)	Copper alloy >15% Zn	Condensation -EXT	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F2-14 (A-46)	3.3.1-25	E
16	Heat exchanger (cooling coil)	Leakage boundary (spatial)	Copper alloy >15% Zn	Condensation -EXT	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	N/A	N/A	H

Table 3.3.2-6 (continued): Chilled Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
17	Heat exchanger (header)	Leakage boundary (spatial)	Gray cast iron	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-1 (A-63)	3.3.1-48	A
18	Heat exchanger (header)	Leakage boundary (spatial)	Gray cast iron	Closed cycle cooling water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C2-8 (A-50)	3.3.1-85	D
19	Heat exchanger (header)	Leakage boundary (spatial)	Gray cast iron	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
20	Heat exchanger (header)	Leakage boundary (spatial)	Gray cast iron	Condensation -EXT	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	N/A	N/A	G
21	Heat exchanger (header)	Leakage boundary (spatial)	Gray cast iron	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A
22	Heat exchanger (shell)	Leakage boundary (spatial)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-1 (A-63)	3.3.1-48	A
23	Heat exchanger (shell)	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-6 (continued): Chilled Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
24	Heat exchanger (shell)	Leakage boundary (spatial)	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A
25	Orifice	Leakage boundary (spatial)	Stainless steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-10 (A-52)	3.3.1-50	A
26	Orifice	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
27	Orifice	Leakage boundary (spatial)	Stainless steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-1 (A-09)	3.3.1-27	E
28	Orifice	Leakage boundary (spatial)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-14 (A-25)	3.3.1-47	A
29	Orifice	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
30	Orifice	Leakage boundary (spatial)	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A

Table 3.3.2-6 (continued): Chilled Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
31	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
32	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-14 (A-25)	3.3.1-47	A
33	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F4-2 (A-08)	3.3.1-72	A

Table 3.3.2-6 (continued): Chilled Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
34	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
35	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
36	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A

Table 3.3.2-6 (continued): Chilled Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
37	Piping	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
38	Piping	Pressure boundary	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-14 (A-25)	3.3.1-47	A
39	Piping	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
40	Piping	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
41	Piping	Pressure boundary	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A
42	Pump casing	Leakage boundary (spatial)	Copper alloy >15% Zn	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-4 (AP-12)	3.3.1-51	A
43	Pump casing	Leakage boundary (spatial)	Copper alloy >15% Zn	Closed cycle cooling water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C2-6 (AP-43)	3.3.1-84	B

Table 3.3.2-6 (continued): Chilled Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
44	Pump casing	Leakage boundary (spatial)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
45	Pump casing	Leakage boundary (spatial)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-14 (A-25)	3.3.1-47	A
46	Pump casing	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
47	Pump casing	Leakage boundary (spatial)	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A
48	Sight glass	Leakage boundary (spatial)	Glass	Closed cycle cooling water	None	None	N/A	N/A	G
49	Sight glass	Leakage boundary (spatial)	Glass	Condensation	None	None	N/A	N/A	G
50	Sight glass	Leakage boundary (spatial)	Glass	Condensation -EXT	None	None	N/A	N/A	G

Table 3.3.2-6 (continued): Chilled Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
51	Strainer body	Leakage boundary (spatial)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-14 (A-25)	3.3.1-47	A
52	Strainer body	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
53	Strainer body	Leakage boundary (spatial)	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A
54	Tank	Leakage boundary (spatial)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-14 (A-25)	3.3.1-47	A
55	Tank	Leakage boundary (spatial)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F4-2 (A-08)	3.3.1-72	A
56	Tank	Leakage boundary (spatial)	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A
57	Tubing	Leakage boundary (spatial)	Stainless steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-10 (A-52)	3.3.1-50	A

Table 3.3.2-6 (continued): Chilled Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
58	Tubing	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
59	Tubing	Leakage boundary (spatial)	Stainless steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-1 (A-09)	3.3.1-27	E
60	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-10 (A-52)	3.3.1-50	A
61	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A

Table 3.3.2-6 (continued): Chilled Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
62	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-1 (A-09)	3.3.1-27	E
63	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-14 (A-25)	3.3.1-47	A
64	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F4-2 (A-08)	3.3.1-72	A

Table 3.3.2-6 (continued): Chilled Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
65	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
66	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
67	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A
68	Valve body	Pressure boundary	Cast austenitic stainless steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-10 (A-52)	3.3.1-50	A

Table 3.3.2-6 (continued): Chilled Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
69	Valve body	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
70	Valve body	Pressure boundary	Cast austenitic stainless steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-1 (A-09)	3.3.1-27	E
71	Valve body	Pressure boundary	Stainless steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-10 (A-52)	3.3.1-50	A
72	Valve body	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
73	Valve body	Pressure boundary	Stainless steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-1 (A-09)	3.3.1-27	E
74	Valve body	Pressure boundary	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-14 (A-25)	3.3.1-47	A
75	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-6 (continued): Chilled Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
76	Valve body	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
77	Valve body	Pressure boundary	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A

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

Table 3.3.2-7 : Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Air dryer	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
2	Air dryer	Leakage boundary (spatial)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-23 (A-23)	3.3.1-71	A
3	Air dryer	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
4	Air dryer	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
5	Air dryer	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
6	Air dryer	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
7	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	C
8	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	C

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
9	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
10	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
11	Bolting	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
12	Bolting	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
13	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
14	Bolting	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
15	Chemical injector	Pressure boundary	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.H2-23 (A-25)	3.3.1-47	A
16	Chemical injector	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
17	Filter housing	Leakage boundary (spatial)	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.D-4 (AP-81)	3.3.1-54	E, 321
18	Filter housing	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
19	Filter housing	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
20	Filter housing	Pressure boundary	Aluminum	Dried air	None	None	V.F-2 (EP-3)	3.2.1-50	A, 314

Table 3.3.2-7 (continued): Compressed Air System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
21	Filter housing	Pressure boundary	Aluminum	Air - indoor uncontrolled-EXT	None	None	VII.J-1 (AP-36)	3.3.1-95	A
22	Filter housing	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
23	Filter housing	Pressure boundary	Steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-10 (A-30)	3.3.1-20	B
24	Filter housing	Pressure boundary	Steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-10 (A-30)	3.3.1-20	A
25	Filter housing	Pressure boundary	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.H2-20 (AP-30)	3.3.1-14	A
26	Filter housing	Pressure boundary	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.H2-20 (AP-30)	3.3.1-14	A
27	Filter housing	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
28	Flexible hose	Pressure boundary	Elastomers	Closed cycle cooling water	None	None	N/A	N/A	G

Table 3.3.2-7 (continued): Compressed Air System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
29	Flexible hose	Pressure boundary	Elastomers	Fuel oil	None	None	N/A	N/A	G
30	Flexible hose	Pressure boundary	Elastomers	Lubricating oil	None	None	N/A	N/A	G
31	Flexible hose	Pressure boundary	Elastomers	Air - indoor uncontrolled-EXT	Cracking	External Surfaces Monitoring (B.2.15)	N/A	N/A	H
32	Flexible hose	Pressure boundary	Elastomers	Air - indoor uncontrolled-EXT	Hardening and Loss of strength	External Surfaces Monitoring (B.2.15)	VII.F4-6 (A-17)	3.3.1-11	E
33	Flexible hose	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
34	Flexible hose	Pressure boundary	Stainless steel	Diesel exhaust	Cracking	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.H2-1 (AP-33)	3.3.1-06	E
35	Flexible hose	Pressure boundary	Stainless steel	Diesel exhaust	Cumulative fatigue damage	TLAA	N/A	N/A	H

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
36	Flexible hose	Pressure boundary	Stainless steel	Diesel exhaust	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.H2-2 (A-27)	3.3.1-18	E
37	Flexible hose	Pressure boundary	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
38	Flexible hose	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
39	Heat exchanger (channel)	Leakage boundary (spatial)	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-1 (A-63)	3.3.1-48	A
40	Heat exchanger (channel)	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
41	Heat exchanger (channel)	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
42	Heat exchanger (fin - diesel cooling water)	Heat transfer	Aluminum	Air - indoor uncontrolled-EXT	Reduction of heat transfer	External Surfaces Monitoring (B.2.15)	N/A	N/A	H

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
43	Heat exchanger (header - diesel coolant)	Pressure boundary	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.H2-23 (A-25)	3.3.1-47	A
44	Heat exchanger (header - diesel coolant)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
45	Heat exchanger (header)	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
46	Heat exchanger (header)	Pressure boundary	Stainless steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.H2-17 (AP-59)	3.3.1-33	A
47	Heat exchanger (header)	Pressure boundary	Stainless steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.H2-17 (AP-59)	3.3.1-33	A
48	Heat exchanger (header)	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
49	Heat exchanger (shell)	Leakage boundary (spatial)	Steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 320

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
50	Heat exchanger (shell)	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
51	Heat exchanger (shell)	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
52	Heat exchanger (tube - diesel cooling water)	Pressure boundary and Heat transfer	Copper alloy >15% Zn	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.F3-8 (AP-34)	3.3.1-51	A
53	Heat exchanger (tube - diesel cooling water)	Pressure boundary and Heat transfer	Copper alloy >15% Zn	Closed cycle cooling water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.H2-12 (AP-43)	3.3.1-84	D
54	Heat exchanger (tube - diesel cooling water)	Pressure boundary and Heat transfer	Copper alloy >15% Zn	Closed cycle cooling water	Reduction of heat transfer	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-2 (AP-80)	3.3.1-52	A
55	Heat exchanger (tube - diesel cooling water)	Pressure boundary and Heat transfer	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	Reduction of heat transfer	External Surfaces Monitoring (B.2.15)	N/A	N/A	H

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
56	Heat exchanger (tube)	Pressure boundary and Heat transfer	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
57	Heat exchanger (tube)	Pressure boundary and Heat transfer	Stainless steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.H2-17 (AP-59)	3.3.1-33	A
58	Heat exchanger (tube)	Pressure boundary and Heat transfer	Stainless steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.H2-17 (AP-59)	3.3.1-33	A
59	Heat exchanger (tube)	Pressure boundary and Heat transfer	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
60	Moisture separator	Leakage boundary (spatial)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-23 (A-23)	3.3.1-71	A

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
61	Moisture separator	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
62	Moisture separator	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
63	Moisture separator	Pressure boundary	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-23 (A-23)	3.3.1-71	A
64	Moisture separator	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
65	Orifice	Leakage boundary (spatial)	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.D-4 (AP-81)	3.3.1-54	E, 321

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
66	Orifice	Leakage boundary (spatial)	Stainless steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-15 (A-54)	3.3.1-79	E, 320
67	Orifice	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
68	Orifice	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
69	Orifice	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
70	Orifice	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
71	Orifice	Pressure boundary and Flow restriction	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
72	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
73	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy <15% Zn	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-9 (AP-78)	3.3.1-28	E
74	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy <15% Zn	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-9 (A-44)	3.3.1-81	E, 320
75	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy <15% Zn	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.A4-7 (AP-64)	3.3.1-31	A, 305

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
76	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy <15% Zn	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.A4-7 (AP-64)	3.3.1-31	A, 305
77	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
78	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy <15% Zn	Air with borated water leakage-EXT	None	None	VII.J-5 (AP-11)	3.3.1-99	A

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
79	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-9 (A-44)	3.3.1-81	E, 320
80	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.G-13 (A-47)	3.3.1-84	B
81	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
82	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	A
83	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
84	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.D-4 (AP-81)	3.3.1-54	E, 321

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
85	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
86	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
87	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305

Table 3.3.2-7 (continued): Compressed Air System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
88	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
89	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
90	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-23 (A-23)	3.3.1-71	A

Table 3.3.2-7 (continued): Compressed Air System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
91	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A
92	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
93	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
94	Piping	Pressure boundary	Copper alloy <15% Zn	Dried air	None	None	VII.J-3 (AP-8)	3.3.1-98	A

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
95	Piping	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
96	Piping	Pressure boundary	Copper alloy <15% Zn	Air with borated water leakage-EXT	None	None	VII.J-5 (AP-11)	3.3.1-99	A
97	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
98	Piping	Pressure boundary	Stainless steel	Diesel exhaust	Cracking	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.H2-1 (AP-33)	3.3.1-06	E
99	Piping	Pressure boundary	Stainless steel	Diesel exhaust	Cumulative fatigue damage	TLAA	N/A	N/A	H
100	Piping	Pressure boundary	Stainless steel	Diesel exhaust	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.H2-2 (A-27)	3.3.1-18	E
101	Piping	Pressure boundary	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
102	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
103	Piping	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
104	Piping	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
105	Piping	Pressure boundary	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.H2-23 (A-25)	3.3.1-47	A
106	Piping	Pressure boundary	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-23 (A-23)	3.3.1-71	A
107	Piping	Pressure boundary	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A

Table 3.3.2-7 (continued): Compressed Air System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
108	Piping	Pressure boundary	Steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-10 (A-30)	3.3.1-20	B
109	Piping	Pressure boundary	Steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-10 (A-30)	3.3.1-20	A
110	Piping	Pressure boundary	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.H2-20 (AP-30)	3.3.1-14	A
111	Piping	Pressure boundary	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.H2-20 (AP-30)	3.3.1-14	A
112	Piping	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
113	Piping	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
114	Pump casing (compressor lube oil)	Pressure boundary	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.H2-20 (AP-30)	3.3.1-14	A
115	Pump casing (compressor lube oil)	Pressure boundary	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.H2-20 (AP-30)	3.3.1-14	A
116	Pump casing (compressor lube oil)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
117	Pump casing (diesel coolant)	Pressure boundary	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.H2-23 (A-25)	3.3.1-47	A
118	Pump casing (diesel coolant)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
119	Pump casing (diesel fuel oil transfer)	Pressure boundary	Aluminum	Fuel oil	Cracking	Fuel Oil Chemistry (B.2.20)	N/A	N/A	H
120	Pump casing (diesel fuel oil transfer)	Pressure boundary	Aluminum	Fuel oil	Cracking	One-Time Inspection (B.2.30)	N/A	N/A	H
121	Pump casing (diesel fuel oil transfer)	Pressure boundary	Aluminum	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-1 (AP-35)	3.3.1-32	B
122	Pump casing (diesel fuel oil transfer)	Pressure boundary	Aluminum	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-1 (AP-35)	3.3.1-32	A
123	Pump casing (diesel fuel oil transfer)	Pressure boundary	Aluminum	Air - indoor uncontrolled-EXT	None	None	VII.J-1 (AP-36)	3.3.1-95	A
124	Pump casing (diesel lube oil)	Pressure boundary	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.H2-20 (AP-30)	3.3.1-14	A

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
125	Pump casing (diesel lube oil)	Pressure boundary	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.H2-20 (AP-30)	3.3.1-14	A
126	Pump casing (diesel lube oil)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
127	Sight glass	Leakage boundary (spatial)	Glass	Condensation	None	None	N/A	N/A	G
128	Sight glass	Leakage boundary (spatial)	Glass	Raw water	None	None	VII.J-11 (AP-50)	3.3.1-93	A
129	Sight glass	Leakage boundary (spatial)	Glass	Air - indoor uncontrolled-EXT	None	None	VII.J-8 (AP-14)	3.3.1-93	A
130	Sight glass	Leakage boundary (spatial)	Glass	Air with borated water leakage-EXT	None	None	N/A	N/A	G
131	Silencer	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
132	Silencer	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
133	Strainer body	Leakage boundary (spatial)	Copper alloy >15% Zn	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-9 (A-44)	3.3.1-81	E, 320
134	Strainer body	Leakage boundary (spatial)	Copper alloy >15% Zn	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.G-13 (A-47)	3.3.1-84	B
135	Strainer body	Leakage boundary (spatial)	Copper alloy >15% Zn	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.A4-7 (AP-64)	3.3.1-31	A, 305
136	Strainer body	Leakage boundary (spatial)	Copper alloy >15% Zn	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.A4-7 (AP-64)	3.3.1-31	A, 305
137	Strainer body	Leakage boundary (spatial)	Copper alloy >15% Zn	Treated water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C2-7 (AP-32)	3.3.1-84	B
138	Strainer body	Leakage boundary (spatial)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
139	Strainer body	Leakage boundary (spatial)	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	A
140	Tank	Pressure boundary	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
141	Tank	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
142	Tank	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
143	Tank	Pressure boundary	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-23 (A-23)	3.3.1-71	A
144	Tank	Pressure boundary	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A
145	Tank	Pressure boundary	Steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-10 (A-30)	3.3.1-20	B

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
146	Tank	Pressure boundary	Steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-10 (A-30)	3.3.1-20	A
147	Tank	Pressure boundary	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.H2-20 (AP-30)	3.3.1-14	A
148	Tank	Pressure boundary	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.H2-20 (AP-30)	3.3.1-14	A
149	Tank	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
150	Trap body	Leakage boundary (spatial)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-23 (A-23)	3.3.1-71	A
151	Trap body	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
152	Trap body	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-7 (continued): Compressed Air System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
153	Tubing	Leakage boundary (spatial)	Copper alloy <15% Zn	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-9 (AP-78)	3.3.1-28	E
154	Tubing	Leakage boundary (spatial)	Copper alloy <15% Zn	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-9 (A-44)	3.3.1-81	E, 320
155	Tubing	Leakage boundary (spatial)	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
156	Tubing	Leakage boundary (spatial)	Copper alloy <15% Zn	Air with borated water leakage-EXT	None	None	VII.J-5 (AP-11)	3.3.1-99	A
157	Tubing	Leakage boundary (spatial)	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.D-4 (AP-81)	3.3.1-54	E, 321

Table 3.3.2-7 (continued): Compressed Air System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	***NUREG-1801* Volume 2 Item**	**Table 1 Item**	**Notes**
158	Tubing	Leakage boundary (spatial)	Stainless steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-15 (A-54)	3.3.1-79	E, 320
159	Tubing	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
160	Tubing	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
161	Tubing	Pressure boundary	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
162	Tubing	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
163	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304

Table 3.3.2-7 (continued): Compressed Air System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
164	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Condensation	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	N/A	N/A	G
165	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-9 (AP-78)	3.3.1-28	E
166	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-9 (A-44)	3.3.1-81	E, 320

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
167	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.G-13 (A-47)	3.3.1-84	B
168	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.A4-7 (AP-64)	3.3.1-31	A, 305
169	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Treated water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C2-7 (AP-32)	3.3.1-84	B

Table 3.3.2-7 (continued): Compressed Air System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
170	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.A4-7 (AP-64)	3.3.1-31	A, 305
171	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
172	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	A

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
173	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
174	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
175	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
176	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
177	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A
178	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-7 (continued): Compressed Air System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
179	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
180	Valve body	Pressure boundary	Cast austenitic stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
181	Valve body	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
182	Valve body	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
183	Valve body	Pressure boundary	Copper alloy >15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304

Table 3.3.2-7 (continued): Compressed Air System									
Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
184	Valve body	Pressure boundary	Copper alloy >15% Zn	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.H2-8 (AP-12)	3.3.1-51	A
185	Valve body	Pressure boundary	Copper alloy >15% Zn	Closed cycle cooling water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.H2-12 (AP-43)	3.3.1-84	B
186	Valve body	Pressure boundary	Copper alloy >15% Zn	Dried air	None	None	VII.J-3 (AP-8)	3.3.1-98	A
187	Valve body	Pressure boundary	Copper alloy >15% Zn	Fuel oil	Cracking	One-Time Inspection (B.2.30)	N/A	N/A	H
188	Valve body	Pressure boundary	Copper alloy >15% Zn	Fuel oil	Cracking	Fuel Oil Chemistry (B.2.20)	N/A	N/A	H
189	Valve body	Pressure boundary	Copper alloy >15% Zn	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-3 (AP-44)	3.3.1-32	B
190	Valve body	Pressure boundary	Copper alloy >15% Zn	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-3 (AP-44)	3.3.1-32	A

Table 3.3.2-7 (continued): Compressed Air System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
191	Valve body	Pressure boundary	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
192	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
193	Valve body	Pressure boundary	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
194	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
195	Valve body	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
196	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
197	Valve body	Pressure boundary	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A
198	Valve body	Pressure boundary	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.H2-20 (AP-30)	3.3.1-14	A

Table 3.3.2-7 (continued): Compressed Air System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
199	Valve body	Pressure boundary	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.H2-20 (AP-30)	3.3.1-14	A
200	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
201	Valve body	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-8
Auxiliary Systems –
Containment System –
Summary of Aging Management Evaluation

Table 3.3.2-8 : Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Actuator housing (hydraulic)	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.F2-17 (AP-30)	3.3.1-14	A
2	Actuator housing (hydraulic)	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.F2-17 (AP-30)	3.3.1-14	A
3	Actuator housing (hydraulic)	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
4	Actuator housing (hydraulic)	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
5	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C

Table 3.3.2-8 (continued): Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
6	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
7	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
8	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
9	Bolting	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C

Table 3.3.2-8 (continued): Containment System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	***NUREG-1801* Volume 2 Item**	**Table 1 Item**	**Notes**
10	Bolting	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
11	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
12	Bolting	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
13	Flexible hose	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.F2-17 (AP-30)	3.3.1-14	A
14	Flexible hose	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.F2-17 (AP-30)	3.3.1-14	A
15	Flexible hose	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
16	Flexible hose	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-8 (continued): Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
17	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy <15% Zn	Dried air	None	None	VII.J-3 (AP-8)	3.3.1-98	A
18	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy <15% Zn	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-12 (AP-47)	3.3.1-26	A, 312
19	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy <15% Zn	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-12 (AP-47)	3.3.1-26	A, 312

Table 3.3.2-8 (continued): Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
20	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
21	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy <15% Zn	Air with borated water leakage-EXT	None	None	VII.J-5 (AP-11)	3.3.1-99	A
22	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A

Table 3.3.2-8 (continued): Containment System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
23	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
24	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
25	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.F2-17 (AP-30)	3.3.1-14	A

Table 3.3.2-8 (continued): Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
26	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.F2-17 (AP-30)	3.3.1-14	A
27	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
28	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
29	Piping	Pressure boundary	Copper alloy <15% Zn	Dried air	None	None	VII.J-3 (AP-8)	3.3.1-98	A

Table 3.3.2-8 (continued): Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
30	Piping	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
31	Piping	Pressure boundary	Copper alloy <15% Zn	Air with borated water leakage-EXT	None	None	VII.J-5 (AP-11)	3.3.1-99	A
32	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
33	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
34	Piping	Pressure boundary	Stainless steel	Air - outdoor-EXT	None	None	N/A	N/A	G
35	Piping	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
36	Piping	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A

Table 3.3.2-8 (continued): Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
37	Piping	Pressure boundary	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A
38	Piping	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
39	Piping	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
40	Piping (fittings)	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-15 (AP-59)	3.3.1-33	A
41	Piping (fittings)	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-15 (AP-59)	3.3.1-33	A

Table 3.3.2-8 (continued): Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
42	Piping (fittings)	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
43	Piping (fittings)	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
44	Pump casing	Leakage boundary (spatial)	Cast austenitic stainless steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-15 (AP-59)	3.3.1-33	A
45	Pump casing	Leakage boundary (spatial)	Cast austenitic stainless steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-15 (AP-59)	3.3.1-33	A

Table 3.3.2-8 (continued): Containment System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
46	Pump casing	Leakage boundary (spatial)	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
47	Pump casing	Leakage boundary (spatial)	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
48	Pump casing	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.F2-17 (AP-30)	3.3.1-14	A
49	Pump casing	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.F2-17 (AP-30)	3.3.1-14	A
50	Pump casing	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
51	Pump casing	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
52	Sight glass	Leakage boundary (spatial)	Glass	Air - indoor uncontrolled	None	None	VII.J-8 (AP-14)	3.3.1-93	A, 304

Table 3.3.2-8 (continued): Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
53	Sight glass	Leakage boundary (spatial)	Glass	Dried air	None	None	VII.J-7 (AP-48)	3.3.1-93	A, 311
54	Sight glass	Leakage boundary (spatial)	Glass	Lubricating oil	None	None	VII.J-10 (AP-15)	3.3.1-93	A
55	Sight glass	Leakage boundary (spatial)	Glass	Air - indoor uncontrolled-EXT	None	None	VII.J-8 (AP-14)	3.3.1-93	A
56	Sight glass	Leakage boundary (spatial)	Glass	Air with borated water leakage-EXT	None	None	N/A	N/A	G
57	Strainer body	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.F2-17 (AP-30)	3.3.1-14	A
58	Strainer body	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.F2-17 (AP-30)	3.3.1-14	A
59	Strainer body	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-8 (continued): Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
60	Strainer body	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
61	Tank	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
62	Tank	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.F2-17 (AP-30)	3.3.1-14	A
63	Tank	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.F2-17 (AP-30)	3.3.1-14	A
64	Tank	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
65	Tank	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-8 (continued): Containment System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
66	Tubing	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
67	Tubing	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.E1-15 (AP-59)	3.3.1-33	A
68	Tubing	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.E1-15 (AP-59)	3.3.1-33	A

Table 3.3.2-8 (continued): Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
69	Tubing	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
70	Tubing	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
71	Tubing	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304
72	Tubing	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
73	Tubing	Pressure boundary	Copper alloy <15% Zn	Air with borated water leakage-EXT	None	None	VII.J-5 (AP-11)	3.3.1-99	A

Table 3.3.2-8 (continued): Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
74	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Cast austenitic stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
75	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
76	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A

Table 3.3.2-8 (continued): Containment System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
77	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Dried air	None	None	VII.J-3 (AP-8)	3.3.1-98	A
78	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
79	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	A

Table 3.3.2-8 (continued): Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
80	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
81	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
82	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A

Table 3.3.2-8 (continued): Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
83	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.F2-17 (AP-30)	3.3.1-14	A
84	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.F2-17 (AP-30)	3.3.1-14	A
85	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-8 (continued): Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
86	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
87	Valve body	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
88	Valve body	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
89	Valve body	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
90	Valve body	Pressure boundary	Copper alloy >15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304

Table 3.3.2-8 (continued): Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
91	Valve body	Pressure boundary	Copper alloy >15% Zn	Dried air	None	None	VII.J-3 (AP-8)	3.3.1-98	A
92	Valve body	Pressure boundary	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
93	Valve body	Pressure boundary	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	A
94	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
95	Valve body	Pressure boundary	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
96	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
97	Valve body	Pressure boundary	Stainless steel	Air - outdoor-EXT	None	None	N/A	N/A	G
98	Valve body	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A

Table 3.3.2-8 (continued): Containment System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
99	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
100	Valve body	Pressure boundary	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A
101	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
102	Valve body	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-9
Auxiliary Systems –
Containment Vacuum and Leak Monitoring System –
Summary of Aging Management Evaluation

Table 3.3.2-9 : Containment Vacuum and Leak Monitoring System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
2	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
3	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
4	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
5	Bolting	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
6	Bolting	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
7	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
8	Bolting	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
9	Ejector (body)	Leakage boundary (spatial) and/or Structural integrity (attached)	Gray cast iron	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
10	Ejector (body)	Leakage boundary (spatial) and/or Structural integrity (attached)	Gray cast iron	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
11	Ejector (body)	Leakage boundary (spatial) and/or Structural integrity (attached)	Gray cast iron	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System									
Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
12	Ejector (nozzle)	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
13	Ejector (nozzle)	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
14	Ejector (nozzle)	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
15	Flexible hose	Leakage boundary (spatial)	Nickel alloy	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 302, 305

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
16	Flexible hose	Leakage boundary (spatial)	Nickel alloy	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 302, 305
17	Flexible hose	Leakage boundary (spatial)	Nickel alloy	Air - indoor uncontrolled-EXT	None	None	VII.J-14 (AP-16)	3.3.1-94	A
18	Flexible hose	Leakage boundary (spatial)	Nickel alloy	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A, 302
19	Flexible hose	Pressure boundary	Nickel alloy	Air - indoor uncontrolled	None	None	VII.J-14 (AP-16)	3.3.1-94	A, 304
20	Flexible hose	Pressure boundary	Nickel alloy	Air - indoor uncontrolled-EXT	None	None	VII.J-14 (AP-16)	3.3.1-94	A
21	Flexible hose	Pressure boundary	Nickel alloy	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A, 302
22	Heater body	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	C, 304
23	Heater body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
24	Heater body	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	C
25	Moisture separator	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
26	Moisture separator	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-23 (A-23)	3.3.1-71	A
27	Moisture separator	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
28	Moisture separator	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
29	Moisture separator	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
30	Moisture separator	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
31	Moisture separator	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
32	Orifice	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
33	Orifice	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
34	Orifice	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
35	Orifice	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
36	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
37	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
38	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
39	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
40	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F3-1 (A-09)	3.3.1-27	E
41	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
42	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
43	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
44	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-23 (A-23)	3.3.1-71	A
45	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-18 (A-35)	3.3.1-17	C, 305

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
46	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-18 (A-35)	3.3.1-17	C, 305
47	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
48	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
49	Piping	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
50	Piping	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
51	Piping	Pressure boundary	Copper alloy <15% Zn	Air with borated water leakage-EXT	None	None	VII.J-5 (AP-11)	3.3.1-99	A
52	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
53	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
54	Piping	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
55	Piping	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
56	Piping	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
57	Piping	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
58	Pump casing	Leakage boundary (spatial) and/or Structural integrity (attached)	Gray cast iron	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
59	Pump casing	Leakage boundary (spatial) and/or Structural integrity (attached)	Gray cast iron	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-18 (A-35)	3.3.1-17	C, 305
60	Pump casing	Leakage boundary (spatial) and/or Structural integrity (attached)	Gray cast iron	Treated water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C2-9 (AP-31)	3.3.1-85	B

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
61	Pump casing	Leakage boundary (spatial) and/or Structural integrity (attached)	Gray cast iron	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-18 (A-35)	3.3.1-17	C, 305
62	Pump casing	Leakage boundary (spatial) and/or Structural integrity (attached)	Gray cast iron	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
63	Pump casing	Leakage boundary (spatial) and/or Structural integrity (attached)	Gray cast iron	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
64	Strainer body	Leakage boundary (spatial)	Gray cast iron	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-18 (A-35)	3.3.1-17	C, 305

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
65	Strainer body	Leakage boundary (spatial)	Gray cast iron	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-18 (A-35)	3.3.1-17	C, 305
66	Strainer body	Leakage boundary (spatial)	Gray cast iron	Treated water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C2-9 (AP-31)	3.3.1-85	B
67	Strainer body	Leakage boundary (spatial)	Gray cast iron	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
68	Strainer body	Leakage boundary (spatial)	Gray cast iron	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
69	Trap body	Leakage boundary (spatial)	Gray cast iron	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
70	Trap body	Leakage boundary (spatial)	Gray cast iron	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-23 (A-23)	3.3.1-71	A

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
71	Trap body	Leakage boundary (spatial)	Gray cast iron	Condensation	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	N/A	N/A	G
72	Trap body	Leakage boundary (spatial)	Gray cast iron	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
73	Trap body	Leakage boundary (spatial)	Gray cast iron	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
74	Trap body	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
75	Trap body	Leakage boundary (spatial)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-23 (A-23)	3.3.1-71	A
76	Trap body	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
77	Trap body	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
78	Tubing	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-15 (A-58)	3.3.1-24	C, 305
79	Tubing	Leakage boundary (spatial)	Stainless steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-15 (A-58)	3.3.1-24	C, 305
80	Tubing	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
81	Tubing	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
82	Tubing	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
83	Tubing	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
84	Tubing	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System									
Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
85	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
86	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F3-1 (A-09)	3.3.1-27	E
87	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
88	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
89	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
90	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Treated water	Loss of material	One-Time Inspection (B.2.30)	VII.E3-18 (A-35)	3.3.1-17	C, 305

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
91	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Treated water	Loss of material	Water Chemistry (B.2.42)	VII.E3-18 (A-35)	3.3.1-17	C, 305
92	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
93	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A
94	Valve body	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System									
Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
95	Valve body	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
96	Valve body	Pressure boundary	Cast austenitic stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
97	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
98	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
99	Valve body	Pressure boundary	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A
100	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A

Table 3.3.2-9 (continued): Containment Vacuum and Leak Monitoring System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
101	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
102	Valve body	Pressure boundary	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-10 (A-79)	3.3.1-89	A

Table 3.3.2-10
Auxiliary Systems –
Domestic Water System –
Summary of Aging Management Evaluation

Table 3.3.2-10 : Domestic Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Bolting	Leakage boundary (spatial)	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	C
2	Bolting	Leakage boundary (spatial)	Copper alloy <15% Zn	Air with borated water leakage-EXT	None	None	VII.J-5 (AP-11)	3.3.1-99	C
3	Bolting	Leakage boundary (spatial)	Copper alloy <15% Zn	Condensation -EXT	Loss of material	Bolting Integrity (B.2.6)	VII.F2-14 (A-46)	3.3.1-25	E
4	Bolting	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
5	Bolting	Leakage boundary (spatial)	Steel	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-2 (A-102)	3.3.1-89	A
6	Bolting	Leakage boundary (spatial)	Steel	Condensation -EXT	Loss of material	Bolting Integrity (B.2.6)	VII.D-1 (A-103)	3.3.1-44	A

Table 3.3.2-10 (continued): Domestic Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
7	Heat exchanger (header and shell)	Leakage boundary (spatial)	Steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-5 (A-64)	3.3.1-77	E, 322
8	Heat exchanger (header and shell)	Leakage boundary (spatial)	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A
9	Heat exchanger (tube)	Leakage boundary (spatial)	Copper alloy <15% Zn	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-3 (A-65)	3.3.1-82	E, 322
10	Heat exchanger (tube)	Leakage boundary (spatial)	Copper alloy <15% Zn	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-14 (A-46)	3.3.1-25	E
11	Level gage	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304

Table 3.3.2-10 (continued): Domestic Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
12	Level gage	Leakage boundary (spatial)	Stainless steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-15 (A-54)	3.3.1-79	E, 322
13	Level gage	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
14	Piping	Leakage boundary (spatial)	Copper alloy <15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304
15	Piping	Leakage boundary (spatial)	Copper alloy <15% Zn	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-9 (A-44)	3.3.1-81	E, 322
16	Piping	Leakage boundary (spatial)	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
17	Piping	Leakage boundary (spatial)	Copper alloy <15% Zn	Air with borated water leakage-EXT	None	None	VII.J-5 (AP-11)	3.3.1-99	A

Table 3.3.2-10 (continued): Domestic Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
18	Piping	Leakage boundary (spatial)	Copper alloy <15% Zn	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-14 (A-46)	3.3.1-25	E
19	Piping	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
20	Piping	Leakage boundary (spatial)	Steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 322
21	Piping	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
22	Pump casing	Leakage boundary (spatial)	Steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 322

Table 3.3.2-10 (continued): Domestic Water System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
23	Pump casing	Leakage boundary (spatial)	Steel	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-11 (A-81)	3.3.1-58	A
24	Strainer body	Leakage boundary (spatial)	Copper alloy >15% Zn	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C1-10 (A-47)	3.3.1-84	B
25	Strainer body	Leakage boundary (spatial)	Copper alloy >15% Zn	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-9 (A-44)	3.3.1-81	E, 322
26	Strainer body	Leakage boundary (spatial)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
27	Strainer body	Leakage boundary (spatial)	Copper alloy >15% Zn	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-14 (A-46)	3.3.1-25	E
28	Strainer body	Leakage boundary (spatial)	Copper alloy >15% Zn	Condensation -EXT	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	N/A	N/A	H

Table 3.3.2-10 (continued): Domestic Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
29	Tank	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
30	Tank	Leakage boundary (spatial)	Steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 322
31	Tank	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
32	Valve body	Leakage boundary (spatial)	Copper alloy <15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304
33	Valve body	Leakage boundary (spatial)	Copper alloy <15% Zn	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-9 (A-44)	3.3.1-81	E, 322

Table 3.3.2-10 (continued): Domestic Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
34	Valve body	Leakage boundary (spatial)	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
35	Valve body	Leakage boundary (spatial)	Copper alloy <15% Zn	Air with borated water leakage-EXT	None	None	VII.J-5 (AP-11)	3.3.1-99	A
36	Valve body	Leakage boundary (spatial)	Copper alloy <15% Zn	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-14 (A-46)	3.3.1-25	E
37	Valve body	Leakage boundary (spatial)	Copper alloy >15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304
38	Valve body	Leakage boundary (spatial)	Copper alloy >15% Zn	Raw water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.C1-10 (A-47)	3.3.1-84	B
39	Valve body	Leakage boundary (spatial)	Copper alloy >15% Zn	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-9 (A-44)	3.3.1-81	E, 322
40	Valve body	Leakage boundary (spatial)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A

Table 3.3.2-10 (continued): Domestic Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
41	Valve body	Leakage boundary (spatial)	Copper alloy >15% Zn	Air with borated water leakage-EXT	Loss of material	Boric Acid Corrosion (B.2.7)	VII.I-12 (AP-66)	3.3.1-88	A
42	Valve body	Leakage boundary (spatial)	Copper alloy >15% Zn	Condensation -EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.F2-14 (A-46)	3.3.1-25	E
43	Valve body	Leakage boundary (spatial)	Copper alloy >15% Zn	Condensation -EXT	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	N/A	N/A	H
44	Valve body	Leakage boundary (spatial)	Steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-19 (A-38)	3.3.1-76	E, 322
45	Valve body	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
46	Water hammer arrestor	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304

Table 3.3.2-10 (continued): Domestic Water System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
47	Water hammer arrestor	Leakage boundary (spatial)	Stainless steel	Raw water	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.C1-15 (A-54)	3.3.1-79	E, 322
48	Water hammer arrestor	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
49	Water hammer arrestor	Leakage boundary (spatial)	Stainless steel	Air with borated water leakage-EXT	None	None	VII.J-16 (AP-18)	3.3.1-99	A

Table 3.3.2-11
Auxiliary Systems –
Emergency Diesel Generators and Air Intake and Exhaust System –
Summary of Aging Management Evaluation

Table 3.3.2-11 : Emergency Diesel Generators and Air Intake and Exhaust System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Blower housing (Unit 1 generator)	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
2	Blower housing (Unit 1 generator)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
3	Bolting	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
4	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
5	Expansion joint	Pressure boundary	Elastomers	Air - indoor uncontrolled	Cracking	External Surfaces Monitoring (B.2.15)	N/A	N/A	H, 303
6	Expansion joint	Pressure boundary	Elastomers	Air - indoor uncontrolled	Hardening and loss of strength	External Surfaces Monitoring (B.2.15)	VII.F4-6 (A-17)	3.3.1-11	E, 303

Table 3.3.2-11 (continued): Emergency Diesel Generators and Air Intake and Exhaust System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
7	Expansion joint	Pressure boundary	Elastomers	Air - indoor uncontrolled-EXT	Cracking	External Surfaces Monitoring (B.2.15)	N/A	N/A	H
8	Expansion joint	Pressure boundary	Elastomers	Air - indoor uncontrolled-EXT	Hardening and loss of strength	External Surfaces Monitoring (B.2.15)	VII.F4-6 (A-17)	3.3.1-11	E
9	Expansion joint	Pressure boundary	Stainless steel	Diesel exhaust	Cracking	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.H2-1 (AP-33)	3.3.1-06	E
10	Expansion joint	Pressure boundary	Stainless steel	Diesel exhaust	Cumulative fatigue damage	TLAA	N/A	N/A	H
11	Expansion joint	Pressure boundary	Stainless steel	Diesel exhaust	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.H2-2 (A-27)	3.3.1-18	E
12	Expansion joint	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A

Table 3.3.2-11 (continued): Emergency Diesel Generators and Air Intake and Exhaust System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
13	Filter housing	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
14	Filter housing	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
15	Flexible hose	Pressure boundary	Stainless steel	Diesel exhaust	Cracking	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.H2-1 (AP-33)	3.3.1-06	E
16	Flexible hose	Pressure boundary	Stainless steel	Diesel exhaust	Cumulative fatigue damage	TLAA	N/A	N/A	H
17	Flexible hose	Pressure boundary	Stainless steel	Diesel exhaust	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.H2-2 (A-27)	3.3.1-18	E

Table 3.3.2-11 (continued): Emergency Diesel Generators and Air Intake and Exhaust System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
18	Flexible hose	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
19	Heat exchanger (fin)	Heat transfer	Aluminum	Air - indoor uncontrolled	Reduction of heat transfer	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	N/A	N/A	H, 313
20	Heat exchanger (header)	Pressure boundary	Steel	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-1 (A-63)	3.3.1-48	A
21	Heat exchanger (header)	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
22	Heat exchanger (tube)	Pressure boundary and Heat transfer	Copper alloy >15% Zn	Closed cycle cooling water	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	VII.H2-12 (AP-43)	3.3.1-84	D
23	Heat exchanger (tube)	Pressure boundary and Heat transfer	Copper alloy >15% Zn	Closed cycle cooling water	Loss of material	Closed-Cycle Cooling Water System (B.2.9)	VII.F3-8 (AP-34)	3.3.1-51	A

Table 3.3.2-11 (continued): Emergency Diesel Generators and Air Intake and Exhaust System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
24	Heat exchanger (tube)	Pressure boundary and Heat transfer	Copper alloy >15% Zn	Closed cycle cooling water	Reduction of heat transfer	Closed-Cycle Cooling Water System (B.2.9)	VII.C2-2 (AP-80)	3.3.1-52	A
25	Heat exchanger (tube)	Pressure boundary and Heat transfer	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	Reduction of heat transfer	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	N/A	N/A	A, 313
26	Piping	Pressure boundary	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F3-1 (A-09)	3.3.1-27	E
27	Piping	Pressure boundary	Stainless steel	Diesel exhaust	Cracking	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.H2-1 (AP-33)	3.3.1-06	E
28	Piping	Pressure boundary	Stainless steel	Diesel exhaust	Cumulative fatigue damage	TLAA	N/A	N/A	H

Table 3.3.2-11 (continued): Emergency Diesel Generators and Air Intake and Exhaust System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
29	Piping	Pressure boundary	Stainless steel	Diesel exhaust	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.H2-2 (A-27)	3.3.1-18	E
30	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
31	Piping	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
32	Piping	Pressure boundary	Steel	Diesel exhaust	Cumulative fatigue damage	TLAA	N/A	N/A	H
33	Piping	Pressure boundary	Steel	Diesel exhaust	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.H2-2 (A-27)	3.3.1-18	E

Table 3.3.2-11 (continued): Emergency Diesel Generators and Air Intake and Exhaust System									
Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
34	Piping	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
35	Piping	Pressure boundary	Steel	Air - outdoor-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.H1-8 (A-24)	3.3.1-60	A
36	Silencer	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
37	Silencer	Pressure boundary	Steel	Diesel exhaust	Cumulative fatigue damage	TLAA	N/A	N/A	H
38	Silencer	Pressure boundary	Steel	Diesel exhaust	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.H2-2 (A-27)	3.3.1-18	E
39	Silencer	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-11 (continued): Emergency Diesel Generators and Air Intake and Exhaust System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
40	Tubing	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304
41	Tubing	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
42	Turbocharger housing	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
43	Turbocharger housing	Pressure boundary	Steel	Diesel exhaust	Cumulative fatigue damage	TLAA	N/A	N/A	H
44	Turbocharger housing	Pressure boundary	Steel	Diesel exhaust	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.H2-2 (A-27)	3.3.1-18	E
45	Turbocharger housing	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-11 (continued): Emergency Diesel Generators and Air Intake and Exhaust System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
46	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
47	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-12
Auxiliary Systems –
Emergency Diesel Generators—Air Start System –
Summary of Aging Management Evaluation

Table 3.3.2-12 : Emergency Diesel Generators—Air Start System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Air dryer	Leakage boundary (spatial)	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F3-1 (A-09)	3.3.1-27	E
2	Air dryer	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
3	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C

Table 3.3.2-12 (continued): Emergency Diesel Generators—Air Start System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
4	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Cumulative fatigue damage	TLAA	VII.E1-18 (A-34)	3.3.1-02	C
5	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
6	Bolting	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
7	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
8	Filter housing	Pressure boundary	Aluminum	Dried air	None	None	V.F-2 (EP-3)	3.2.1-50	A, 314

Table 3.3.2-12 (continued): Emergency Diesel Generators—Air Start System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
9	Filter housing	Pressure boundary	Aluminum	Air - indoor uncontrolled-EXT	None	None	VII.J-1 (AP-36)	3.3.1-95	A
10	Filter housing	Pressure boundary	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A
11	Filter housing	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
12	Flexible hose	Leakage boundary (spatial)	Polymer	Condensation	None	None	N/A	N/A	F
13	Flexible hose	Leakage boundary (spatial)	Polymer	Air - indoor uncontrolled-EXT	None	None	N/A	N/A	F
14	Flexible hose	Pressure boundary	Copper alloy >15% Zn	Dried air	None	None	VII.J-3 (AP-8)	3.3.1-98	A
15	Flexible hose	Pressure boundary	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
16	Flexible hose	Pressure boundary	Elastomers	Dried air	Cracking	External Surfaces Monitoring (B.2.15)	N/A	N/A	H, 303

Table 3.3.2-12 (continued): Emergency Diesel Generators—Air Start System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
17	Flexible hose	Pressure boundary	Elastomers	Dried air	Hardening and loss of strength	External Surfaces Monitoring (B.2.15)	VII.F4-6 (A-17)	3.3.1-11	E, 303, 314
18	Flexible hose	Pressure boundary	Elastomers	Air - indoor uncontrolled-EXT	Cracking	External Surfaces Monitoring (B.2.15)	N/A	N/A	H
19	Flexible hose	Pressure boundary	Elastomers	Air - indoor uncontrolled-EXT	Hardening and loss of strength	External Surfaces Monitoring (B.2.15)	VII.F4-6 (A-17)	3.3.1-11	E
20	Heat exchanger (cabinet)	Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
21	Heat exchanger (cabinet)	Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
22	Heat exchanger (tube)	Structural integrity (attached)	Copper alloy <15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	C, 304
23	Heat exchanger (tube)	Structural integrity (attached)	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A

Table 3.3.2-12 (continued): Emergency Diesel Generators—Air Start System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
24	Injector	Pressure boundary	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A
25	Injector	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
26	Moisture Separator	Leakage boundary (spatial)	Aluminum	Condensation	Cracking	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	N/A	N/A	H, 310
27	Moisture Separator	Leakage boundary (spatial)	Aluminum	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F4-10 (AP-74)	3.3.1-27	E
28	Moisture Separator	Leakage boundary (spatial)	Aluminum	Air - indoor uncontrolled-EXT	None	None	VII.J-1 (AP-36)	3.3.1-95	A

Table 3.3.2-12 (continued): Emergency Diesel Generators—Air Start System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
29	Moisture separator	Leakage boundary (spatial)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F4-2 (A-08)	3.3.1-72	A
30	Moisture separator	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
31	Motor casing	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
32	Motor casing	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
33	Orifice	Pressure boundary and Flow restriction	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A

Table 3.3.2-12 (continued): Emergency Diesel Generators—Air Start System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
34	Orifice	Pressure boundary and Flow restriction	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
35	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled	Cumulative fatigue damage	TLAA	VII.E1-18 (A-34)	3.3.1-02	A
36	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
37	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F4-2 (A-08)	3.3.1-72	A

Table 3.3.2-12 (continued): Emergency Diesel Generators—Air Start System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
38	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A
39	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
40	Piping	Pressure boundary	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A
41	Piping	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
42	Strainer body	Pressure boundary	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A
43	Strainer body	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-12 (continued): Emergency Diesel Generators—Air Start System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
44	Strainer body	Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
45	Strainer body	Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
46	Tank	Pressure boundary	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A
47	Tank	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
48	Tank	Structural integrity (attached)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F4-2 (A-08)	3.3.1-72	A
49	Tank	Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-12 (continued): Emergency Diesel Generators—Air Start System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
50	Trap body	Leakage boundary (spatial)	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F3-1 (A-09)	3.3.1-27	E
51	Trap body	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
52	Trap body	Leakage boundary (spatial)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F4-2 (A-08)	3.3.1-72	A
53	Trap body	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
54	Tubing	Leakage boundary (spatial)	Copper alloy <15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304

Table 3.3.2-12 (continued): Emergency Diesel Generators—Air Start System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
55	Tubing	Leakage boundary (spatial)	Copper alloy <15% Zn	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-9 (AP-78)	3.3.1-28	E
56	Tubing	Leakage boundary (spatial)	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
57	Tubing	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
58	Tubing	Leakage boundary (spatial)	Stainless steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F3-1 (A-09)	3.3.1-27	E
59	Tubing	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
60	Tubing	Pressure boundary	Copper alloy <15% Zn	Dried air	None	None	VII.J-3 (AP-8)	3.3.1-98	A

Table 3.3.2-12 (continued): Emergency Diesel Generators—Air Start System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
61	Tubing	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
62	Tubing	Pressure boundary	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
63	Tubing	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
64	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.G-9 (AP-78)	3.3.1-28	E
65	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Condensation	Loss of material	Selective Leaching of Materials Inspection (B.2.36)	N/A	N/A	G

Table 3.3.2-12 (continued): Emergency Diesel Generators—Air Start System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
66	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
67	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled	None	None	VII.J-15 (AP-17)	3.3.1-94	A, 304
68	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A

Table 3.3.2-12 (continued): Emergency Diesel Generators—Air Start System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
69	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
70	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled	Cumulative fatigue damage	TLAA	VII.E1-18 (A-34)	3.3.1-02	A
71	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A

Table 3.3.2-12 (continued): Emergency Diesel Generators—Air Start System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
72	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F4-2 (A-08)	3.3.1-72	A
73	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A
74	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
75	Valve body	Pressure boundary	Aluminum	Dried air	None	None	V.F-2 (EP-3)	3.2.1-50	A, 314

Table 3.3.2-12 (continued): Emergency Diesel Generators—Air Start System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
76	Valve body	Pressure boundary	Aluminum	Air - indoor uncontrolled-EXT	None	None	VII.J-1 (AP-36)	3.3.1-95	A
77	Valve body	Pressure boundary	Copper alloy >15% Zn	Dried air	None	None	VII.J-3 (AP-8)	3.3.1-98	A
78	Valve body	Pressure boundary	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
79	Valve body	Pressure boundary	Stainless steel	Dried air	None	None	VII.J-18 (AP-20)	3.3.1-98	A
80	Valve body	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
81	Valve body	Pressure boundary	Steel	Dried air	None	None	VII.J-22 (AP-4)	3.3.1-98	A
82	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-13
Auxiliary Systems –
Emergency Diesel Generators—Crankcase Vacuum System –
Summary of Aging Management Evaluation

Table 3.3.2-13 : Emergency Diesel Generators—Crankcase Vacuum System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Bolting	Leakage boundary (spatial)	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
2	Bolting	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
3	Bolting	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	C
4	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
5	Expansion joint	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A

Table 3.3.2-13 (continued): Emergency Diesel Generators—Crankcase Vacuum System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
6	Expansion joint	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
7	Flexible hose	Leakage boundary (spatial)	Elastomers	Lubricating oil	None	None	N/A	N/A	G
8	Flexible hose	Leakage boundary (spatial)	Elastomers	Air - indoor uncontrolled-EXT	Cracking	External Surfaces Monitoring (B.2.15)	N/A	N/A	H
9	Flexible hose	Leakage boundary (spatial)	Elastomers	Air - indoor uncontrolled-EXT	Hardening and loss of strength	External Surfaces Monitoring (B.2.15)	VII.F4-6 (A-17)	3.3.1-11	E
10	Moisture separator	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
11	Moisture separator	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.H2-20 (AP-30)	3.3.1-14	A
12	Moisture separator	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.H2-20 (AP-30)	3.3.1-14	A

Table 3.3.2-13 (continued): Emergency Diesel Generators—Crankcase Vacuum System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
13	Moisture separator	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
14	Moisture separator	Pressure boundary	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.H2-20 (AP-30)	3.3.1-14	A
15	Moisture separator	Pressure boundary	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.H2-20 (AP-30)	3.3.1-14	A
16	Moisture separator	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
17	Piping	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
18	Piping	Leakage boundary (spatial)	Steel	Condensation	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	VII.F4-2 (A-08)	3.3.1-72	A

Table 3.3.2-13 (continued): Emergency Diesel Generators—Crankcase Vacuum System									
Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
19	Piping	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.H2-20 (AP-30)	3.3.1-14	A
20	Piping	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.H2-20 (AP-30)	3.3.1-14	A
21	Piping	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
22	Piping	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
23	Piping	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
24	Tubing	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304
25	Tubing	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A

Table 3.3.2-13 (continued): Emergency Diesel Generators—Crankcase Vacuum System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
26	Valve body	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
27	Valve body	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	Lubricating Oil Analysis (B.2.24)	VII.H2-20 (AP-30)	3.3.1-14	A
28	Valve body	Leakage boundary (spatial)	Steel	Lubricating oil	Loss of material	One-Time Inspection (B.2.30)	VII.H2-20 (AP-30)	3.3.1-14	A
29	Valve body	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
30	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
31	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A

Table 3.3.2-14
Auxiliary Systems –
Emergency Diesel Generators—Fuel Oil System –
Summary of Aging Management Evaluation

Table 3.3.2-14 : Emergency Diesel Generators—Fuel Oil System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
1	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A
2	Bolting	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - outdoor-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-1 (AP-28)	3.3.1-43	A
3	Bolting	Pressure boundary	Stainless steel	Air - outdoor-EXT	Loss of material	Bolting Integrity (B.2.6)	N/A	N/A	G
4	Bolting	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-4 (AP-27)	3.3.1-43	A

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
5	Bolting	Pressure boundary	Steel	Air - outdoor-EXT	Loss of material	Bolting Integrity (B.2.6)	VII.I-1 (AP-28)	3.3.1-43	A
6	Bolting	Pressure boundary	Steel	Soil-EXT	Loss of material	Buried Piping and Tanks Inspection (B.2.8)	VII.H1-9 (A-01)	3.3.1-19	C
7	Filter housing	Pressure boundary	Steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-10 (A-30)	3.3.1-20	B
8	Filter housing	Pressure boundary	Steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-10 (A-30)	3.3.1-20	A
9	Filter housing	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
10	Flame arrestor	Flame suppression	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
11	Flame arrestor	Flame suppression	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
12	Flame arrestor	Flame suppression	Steel	Air - outdoor-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.H1-8 (A-24)	3.3.1-60	A

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
13	Flexible hose	Pressure boundary	Elastomers	Fuel oil	None	None	N/A	N/A	G
14	Flexible hose	Pressure boundary	Elastomers	Air - indoor uncontrolled-EXT	Cracking	External Surfaces Monitoring (B.2.15)	N/A	N/A	H
15	Flexible hose	Pressure boundary	Elastomers	Air - indoor uncontrolled-EXT	Hardening and loss of strength	External Surfaces Monitoring (B.2.15)	VII.F4-6 (A-17)	3.3.1-11	E
16	Orifice	Pressure boundary and Flow restriction	Stainless steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-6 (AP-54)	3.3.1-32	B
17	Orifice	Pressure boundary and Flow restriction	Stainless steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-6 (AP-54)	3.3.1-32	A
18	Orifice	Pressure boundary and Flow restriction	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
19	Orifice	Pressure boundary and Flow restriction	Steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-10 (A-30)	3.3.1-20	B

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
20	Orifice	Pressure boundary and Flow restriction	Steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-10 (A-30)	3.3.1-20	A
21	Orifice	Pressure boundary and Flow restriction	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
22	Orifice	Structural integrity (attached)	Steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-10 (A-30)	3.3.1-20	B
23	Orifice	Structural integrity (attached)	Steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-10 (A-30)	3.3.1-20	A
24	Orifice	Structural integrity (attached)	Steel	Air - outdoor-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.H1-8 (A-24)	3.3.1-60	A
25	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Glass	Fuel oil	None	None	VII.J-9 (AP-49)	3.3.1-93	A

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
26	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Glass	Soil-EXT	None	None	N/A	N/A	G
27	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
28	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-10 (A-30)	3.3.1-20	B

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
29	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-10 (A-30)	3.3.1-20	A
30	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
31	Piping	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - outdoor-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.H1-8 (A-24)	3.3.1-60	A
32	Piping	Pressure boundary	Copper alloy >15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
33	Piping	Pressure boundary	Copper alloy >15% Zn	Fuel oil	Cracking	Fuel Oil Chemistry (B.2.20)	N/A	N/A	H
34	Piping	Pressure boundary	Copper alloy >15% Zn	Fuel oil	Cracking	One-Time Inspection (B.2.30)	N/A	N/A	H
35	Piping	Pressure boundary	Copper alloy >15% Zn	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-3 (AP-44)	3.3.1-32	B
36	Piping	Pressure boundary	Copper alloy >15% Zn	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-3 (AP-44)	3.3.1-32	A
37	Piping	Pressure boundary	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
38	Piping	Pressure boundary	Stainless steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-6 (AP-54)	3.3.1-32	A
39	Piping	Pressure boundary	Stainless steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-6 (AP-54)	3.3.1-32	B
40	Piping	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
41	Piping	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
42	Piping	Pressure boundary	Steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-10 (A-30)	3.3.1-20	B
43	Piping	Pressure boundary	Steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-10 (A-30)	3.3.1-20	A
44	Piping	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
45	Piping	Pressure boundary	Steel	Air - outdoor-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.H1-8 (A-24)	3.3.1-60	A
46	Piping	Pressure boundary	Steel	Concrete-EXT	None	None	VII.J-21 (AP-3)	3.3.1-96	A
47	Piping	Pressure boundary	Steel	Soil-EXT	Loss of material	Buried Piping and Tanks Inspection (B.2.8)	VII.H1-9 (A-01)	3.3.1-19	A

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
48	Pump casing	Pressure boundary	Cast austenitic stainless steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-6 (AP-54)	3.3.1-32	B
49	Pump casing	Pressure boundary	Cast austenitic stainless steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-6 (AP-54)	3.3.1-32	A
50	Pump casing	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
51	Pump casing	Pressure boundary	Gray cast iron	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-10 (A-30)	3.3.1-20	B
52	Pump casing	Pressure boundary	Gray cast iron	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-10 (A-30)	3.3.1-20	A
53	Pump casing	Pressure boundary	Gray cast iron	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
54	Pump casing	Pressure boundary	Steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-10 (A-30)	3.3.1-20	B
55	Pump casing	Pressure boundary	Steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-10 (A-30)	3.3.1-20	A

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
56	Pump casing	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
57	Sight glass	Leakage boundary (spatial)	Glass	Air - indoor uncontrolled	None	None	VII.J-8 (AP-14)	3.3.1-93	A, 304
58	Sight glass	Leakage boundary (spatial)	Glass	Fuel oil	None	None	VII.J-9 (AP-49)	3.3.1-93	A
59	Sight glass	Leakage boundary (spatial)	Glass	Air - indoor uncontrolled-EXT	None	None	VII.J-8 (AP-14)	3.3.1-93	A
60	Sight glass	Pressure boundary	Glass	Air - indoor uncontrolled	None	None	VII.J-8 (AP-14)	3.3.1-93	A, 304
61	Sight glass	Pressure boundary	Glass	Fuel oil	None	None	VII.J-9 (AP-49)	3.3.1-93	A
62	Sight glass	Pressure boundary	Glass	Air - indoor uncontrolled-EXT	None	None	VII.J-8 (AP-14)	3.3.1-93	A
63	Strainer body	Leakage boundary (spatial)	Steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-10 (A-30)	3.3.1-20	B

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
64	Strainer body	Leakage boundary (spatial)	Steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-10 (A-30)	3.3.1-20	A
65	Strainer body	Leakage boundary (spatial)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
66	Strainer body	Pressure boundary	Steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-10 (A-30)	3.3.1-20	B
67	Strainer body	Pressure boundary	Steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-10 (A-30)	3.3.1-20	A
68	Strainer body	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
69	Strainer element	Filtration	Stainless steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-6 (AP-54)	3.3.1-32	B
70	Strainer element	Filtration	Stainless steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-6 (AP-54)	3.3.1-32	A
71	Tank	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
72	Tank	Pressure boundary	Steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-10 (A-30)	3.3.1-20	B
73	Tank	Pressure boundary	Steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-10 (A-30)	3.3.1-20	A
74	Tank	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
75	Tank	Pressure boundary	Steel	Concrete-EXT	None	None	VII.J-21 (AP-3)	3.3.1-96	C
76	Tank	Pressure boundary	Steel	Soil-EXT	Loss of material	Buried Piping and Tanks Inspection (B.2.8)	VII.H1-9 (A-01)	3.3.1-19	A
77	Tubing	Pressure boundary	Copper alloy <15% Zn	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-3 (AP-44)	3.3.1-32	B
78	Tubing	Pressure boundary	Copper alloy <15% Zn	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-3 (AP-44)	3.3.1-32	A
79	Tubing	Pressure boundary	Copper alloy <15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
80	Tubing	Pressure boundary	Stainless steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-6 (AP-54)	3.3.1-32	B

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
81	Tubing	Pressure boundary	Stainless steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-6 (AP-54)	3.3.1-32	A
82	Tubing	Pressure boundary	Stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
83	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304
84	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Fuel oil	Cracking	Fuel Oil Chemistry (B.2.20)	N/A	N/A	H

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
85	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Fuel oil	Cracking	One-Time Inspection (B.2.30)	N/A	N/A	H
86	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-3 (AP-44)	3.3.1-32	B
87	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-3 (AP-44)	3.3.1-32	A

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
88	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A
89	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-10 (A-30)	3.3.1-20	B
90	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-10 (A-30)	3.3.1-20	A

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
91	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
92	Valve body	Leakage boundary (spatial) and/or Structural integrity (attached)	Steel	Air - outdoor-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.H1-8 (A-24)	3.3.1-60	A
93	Valve body	Pressure boundary	Cast austenitic stainless steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-6 (AP-54)	3.3.1-32	B
94	Valve body	Pressure boundary	Cast austenitic stainless steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-6 (AP-54)	3.3.1-32	A

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
95	Valve body	Pressure boundary	Cast austenitic stainless steel	Air - indoor uncontrolled-EXT	None	None	VII.J-15 (AP-17)	3.3.1-94	A
96	Valve body	Pressure boundary	Copper alloy >15% Zn	Air - indoor uncontrolled	None	None	VIII.I-2 (SP-6)	3.4.1-41	A, 304
97	Valve body	Pressure boundary	Copper alloy >15% Zn	Fuel oil	Cracking	Fuel Oil Chemistry (B.2.20)	N/A	N/A	H
98	Valve body	Pressure boundary	Copper alloy >15% Zn	Fuel oil	Cracking	One-Time Inspection (B.2.30)	N/A	N/A	H
99	Valve body	Pressure boundary	Copper alloy >15% Zn	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-3 (AP-44)	3.3.1-32	B
100	Valve body	Pressure boundary	Copper alloy >15% Zn	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-3 (AP-44)	3.3.1-32	A
101	Valve body	Pressure boundary	Copper alloy >15% Zn	Air - indoor uncontrolled-EXT	None	None	VIII.I-2 (SP-6)	3.4.1-41	A

Table 3.3.2-14 (continued): Emergency Diesel Generators—Fuel Oil System									
Row No.	**Component Type**	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Volume 2 Item**	**Table 1 Item**	**Notes**
102	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.22)	V.A-19 (E-29)	3.2.1-32	A
103	Valve body	Pressure boundary	Steel	Fuel oil	Loss of material	Fuel Oil Chemistry (B.2.20)	VII.H1-10 (A-30)	3.3.1-20	B
104	Valve body	Pressure boundary	Steel	Fuel oil	Loss of material	One-Time Inspection (B.2.30)	VII.H1-10 (A-30)	3.3.1-20	A
105	Valve body	Pressure boundary	Steel	Air - indoor uncontrolled-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.I-8 (A-77)	3.3.1-58	A
106	Valve body	Pressure boundary	Steel	Air - outdoor-EXT	Loss of material	External Surfaces Monitoring (B.2.15)	VII.H1-8 (A-24)	3.3.1-60	A