APPLICATION FOR RENEWED OPERATING LICENSES

PRAIRIE ISLAND NUCLEAR GENERATING PLANT UNITS 1 AND 2

April 11, 2008

TECHNICAL AND ADMINISTRATIVE INFORMATION

Table of Contents

TECHNICAL AND ADMINISTRATIVE INFORMATION

Table of Contents

TECHNICAL AND ADMINISTRATIVE INFORMATION

Table of Contents

TECHNICAL AND ADMINISTRATIVE INFORMATION

Table of Contents

TECHNICAL AND ADMINISTRATIVE INFORMATION

Table of Contents

TECHNICAL AND ADMINISTRATIVE INFORMATION

Table of Contents

TECHNICAL AND ADMINISTRATIVE INFORMATION

Table of Contents

TECHNICAL AND ADMINISTRATIVE INFORMATION

Table of Contents

TECHNICAL AND ADMINISTRATIVE INFORMATION

Table of Contents

TECHNICAL AND ADMINISTRATIVE INFORMATION

Table of Contents

TECHNICAL AND ADMINISTRATIVE INFORMATION

Table of Contents

TECHNICAL AND ADMINISTRATIVE INFORMATION

Table of Contents

TECHNICAL AND ADMINISTRATIVE INFORMATION
List of Tables

TECHNICAL AND ADMINISTRATIVE INFORMATION
List of Tables

TECHNICAL AND ADMINISTRATIVE INFORMATION
List of Tables

TECHNICAL AND ADMINISTRATIVE INFORMATION
List of Tables

TECHNICAL AND ADMINISTRATIVE INFORMATION
List of Tables

TECHNICAL AND ADMINISTRATIVE INFORMATION
List of Figures

1.0 ADMINISTRATIVE INFORMATION

This License Renewal Application (LRA) has been prepared to provide the administrative, technical and environmental information required by 10 CFR Part 54 (Reference 1) and 10 CFR Part 51 (Reference 2) to support the renewal of the Operating Licenses for the Prairie Island Nuclear Generating Plant (PINGP).

The Updated Safety Analysis Report (USAR), License Renewal scoping boundary drawings, and other references cited within the application are for information only, and are not incorporated by reference into this application.)

Section 1.0 of the application provides the following information:

1. Information on the organization of the application (Section 1.1).
2. General description of PINGP (Section 1.2).
3. The administrative information required by 10 CFR 54.17 and 54.19 (Section 1.3).
4. Requirements for amendments to the LRA pursuant to 10 CFR 54.21(b) (Section 1.4).
5. List of abbreviations (Section 1.5).
6. Distribution list for written communications related to the application (Section 1.6).

1.1 Application Format and Content

The following discussion describes the content of the PINGP LRA. The overall structure of the application is consistent with NEI 95-10, Rev. 6 (Reference 3) and Regulatory Guide 1.188, Rev. 1 (Reference 4).

Section 1.0 provides the administrative information required by 10 CFR 54.17 and 10 CFR 54.19.

Section 2.0 provides the scoping and screening methodology. Section 2.0 also describes and justifies the methodology used to determine the systems, structures, and components within the scope of License Renewal and the structures and components subject to an Aging Management Review (AMR). The system and structure groupings in Sections 2.0 and 3.0 are organized to be consistent with NUREG-1800 (Reference 5). Table 2.2-1, Plant Level Scoping Results, provides a list of the plant mechanical systems, electrical/instrumentation and controls systems, and structures and identifies those plant systems and structures that are within the scope of License Renewal. Section 2.3, Section 2.4, and Section 2.5 provide a description of in-scope systems, structures and commodities, their intended functions, and cross references to USAR sections and License Renewal drawings. Each system/structure subsection has a table listing components subject to an aging management review and their intended function(s).

Section 3.0 identifies the components and structures subject to aging management review, describes the results of the aging management reviews, and compares these results with NUREG-1801, Generic Aging Lessons Learned (GALL) Report (Reference 6). Those PINGP components with aging effects, and Aging Management Programs (AMPs) consistent with NUREG-1801, are listed in a set of tables that are structured like those in NUREG-1801, Volume I, and NUREG-1800, Standard Review Plan (SRP) for License Renewal. A second set of tables in each Section 3.0 system grouping provides aging management information including Component Type, Intended Function, Material, Environment, Aging Effect Requiring Management and selected Aging Management Programs for each component type. These system-specific tables also include columns with references to NUREG -1801, Volume 2 Line Item and associated NUREG-1801 Volume 1, Table 1 Item (duplicated in Table 3.x.1 of each SRP system group). The last column of each table in Section 3.0 is set aside for Notes or additional explanatory information specific to that line item. These tables have hyperlinked cross references to the detailed aging management program information in Appendix B. A detailed description of table construction and interrelationships is provided in Section 3.0.

Section 4.0 provides the list of Time-Limited Aging Analyses (TLAAs) defined by 10 CFR 54.3. It includes the identification of the component or subject and an explanation of the time-dependent aspects of the calculation or analysis. Section 4.0 demonstrates that the analyses remain valid for the period of extended operation, the analyses have been projected to the end of the period of extended operation, or the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

APPENDIX A, Updated Safety Analysis Report Supplement, contains a summary description of the programs for managing the effects of aging for the period of extended operation. A summary description of the evaluation of TLAAs for the period of extended operation is also included.

APPENDIX B, Aging Management Programs, describes the aging management programs and activities. Appendix B demonstrates that the aging effects on the components and structures within the scope of the License Renewal Rule will be managed such that they will continue to perform their intended functions consistent with the Current Licensing Basis for the period of extended operation. Where a PINGP program corresponds to a program in NUREG-1801, the applicable NUREG-1801 program is referenced.

APPENDIX C is not used for this application.

APPENDIX D, Technical Specifications Changes, concludes that no Technical Specifications changes are necessary to manage the effects of aging during the period of extended operation.

APPENDIX E, Environmental Report, contains an environmental report analyzing the potential environmental impacts of License Renewal and alternatives to License Renewal, as provided in NRC regulations 10 CFR 51.53(c) and 10 CFR 54.23. The NRC has determined that nuclear power plant License Renewal decisions are major federal actions requiring preparation of an environmental impact statement. In an effort to improve the efficiency and effectiveness of the License Renewal environmental review, the NRC conducted a generic analysis and published the results in NUREG-1437, Generic Environmental Impact Statement for the License Renewal of Nuclear Power Plants (GEIS). To fulfill National Environmental Policy Act (NEPA) requirements, the NRC publishes a site specific supplement to the GEIS.

1.2 Plant Description

PINGP is located within the city limits of the City of Red Wing, Minnesota on the West bank of the Mississippi River in southeastern Minnesota. Approximately 578 acres of land are owned in fee by Northern States Power Company (NSP) at the plant location. NSP is a wholly owned subsidiary of Xcel Energy Inc. (Xcel Energy). The current PINGP operating licenses expire at midnight on August 9, 2013 for Unit 1 under Facility Operating License Number DPR-42, and on October 29, 2014 for Unit 2 under Facility Operating License Number DPR-60.

The Prairie Island Nuclear Generating Plant, Units 1 and 2, each employ a Westinghouse Electric Corporation 2-loop pressurized water reactor. The PINGP USAR contains an analysis and evaluation of the plant, including the core, based on operation at 1650 MWt per reactor, which is equivalent to a gross electrical output of 575 MWe. Each reactor is capable of an ultimate power output of 1721.4 MWt, and steam and power conversion equipment, including the turbine generator, has the capability to generate a maximum calculated gross unit output of 592 MWe. Plant safety systems, including containment and engineered safeguards, were designed and originally evaluated for operation at the maximum power level of 1721.4 MWt.

The containment for each Unit consists of two systems:

- A primary containment consisting of a free-standing low-leakage steel vessel, including its penetrations, isolation systems and heat removal systems.
- A secondary medium leakage concrete Shield Building surrounding the primary containment, including special ventilation systems for its annulus and adjacent Auxiliary Building.

Detailed descriptions of the PINGP systems and structures can be found in the PINGP USAR. Additional descriptive information about the PINGP systems, structures, and components is provided in Sections 2.0, 3.0, and 4.0 of this application. References to the PINGP USAR are provided where pertinent.

1.3 Information Required by 10 CFR 54.17 and 10 CFR 54.19

1.3.1 Name of Applicant

Nuclear Management Company, LLC (NMC), the operating licensee, hereby applies for renewed operating licenses for the Prairie Island Nuclear Generating Plant. NMC submits this application individually and as agent for the owner licensee Northern States Power Company (NSP), a wholly owned subsidiary of Xcel Energy Inc. (Xcel Energy).

1.3.2 Address of Applicant

Nuclear Management Company, LLC
414 Nicollet Mall
Minneapolis, MN 55401

Northern States Power Company
414 Nicollet Mall
Minneapolis, MN 55401

Address of the Prairie Island Nuclear Generating Plant

Prairie Island Nuclear Generating Plant
1717 Wakonade Dr East
Welch, MN 55089

1.3.3 Description of Business or Occupation of Applicant

Northern States Power Company

Northern States Power Company (NSP), a Minnesota corporation, is an operating utility engaged in the generation, transmission and distribution of electricity and the transportation, storage and distribution of natural gas. NSP provides generation, transmission and distribution of electricity in Minnesota, North Dakota and South Dakota. NSP also purchases, distributes and sells natural gas to retail customers and transports customer-owned gas in Minnesota and North Dakota.

NSP provides retail electric utility service to approximately 1.2 million customers and gas utility service to approximately 430,000 customers.

NSP owns the following direct subsidiaries: United Power and Land Co., which holds real estate, and NSP Nuclear Corp., which holds interest in the Nuclear Management Co. NSP is an equity member of Private Fuel Storage, LLC, a consortium formed to develop a temporary storage facility for spent nuclear fuel.

The Federal Energy Regulatory Commission has jurisdiction over rates for electric transmission service in interstate commerce and wholesale electric energy, hydro facility licensing and certain other activities of NSP. Federal, state and local agencies also have jurisdiction over many of NSP's other activities, including regulation of retail rates and environmental matters.

Retail rates, services and other aspects of NSP operations are subject to the jurisdiction of the Minnesota Public Utilities Commission, the North Dakota Public Service Commission and the South Dakota Public Utilities Commission within their respective states.

Nuclear Management Company, LLC (NMC)

NMC is the exclusive licensed operator of the Prairie Island Nuclear Generating Plant, and is engaged in the operation of nuclear power plants. NMC also operates the Monticello Nuclear Generating Plant for NSP, a subsidiary of Xcel Energy Inc.

NMC has been established as a Wisconsin limited liability corporation owned by NSP Nuclear Corporation, a wholly owned subsidiary of NSP. NMC's corporate purpose is to provide services in connection with the operation and eventual decommissioning of licensed nuclear facilities on behalf of, and for the benefit of, the owner utility.

1.3.4 Organization and Management of Applicant

The Prairie Island Nuclear Generating Plant is owned by NSP, a Minnesota corporation, with principal office located in Minneapolis, MN.

NMC is a limited liability corporation incorporated under the laws of the State of Wisconsin, with its principal office located in Minneapolis, MN.

NSP and NMC are not owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government. NSP and NMC make this application on their own behalf and are not acting as an agent or representative of any other person. The names and business addresses of NSP and NMC directors and principal officers are listed below. All persons listed are U.S. citizens.

Northern States Power Company

Directors

Name	Address
Paul J. Bonavia	414 Nicollet Mall Minneapolis, MN 55401
Benjamin G.S. Fowke III	414 Nicollet Mall Minneapolis, MN 55401

Richard C. Kelly	414 Nicollet Mall Minneapolis, MN 55401
David M. Sparby	414 Nicollet Mall Minneapolis, MN 55401

Principal Officers

Name	Address
Richard C. Kelly Chairman	414 Nicollet Mall Minneapolis, MN 55401
Cynthia L. Lesher President and Chief Executive Officer	414 Nicollet Mall Minneapolis, MN 55401
David M. Sparby Executive Vice President Acting President and Chief Executive Officer	414 Nicollet Mall Minneapolis, MN 55401
Paul J. Bonavia Vice President	414 Nicollet Mall Minneapolis, MN 55401
Raymond E. Gogel Vice President	414 Nicollet Mall Minneapolis, MN 55401
Michael C. Connelly Vice President and General Counsel	414 Nicollet Mall Minneapolis, MN 55401
David M. Wilks Vice President	414 Nicollet Mall Minneapolis, MN 55401
Benjamin G.S. Fowke III Vice President and Chief Financial Officer	414 Nicollet Mall Minneapolis, MN 55401
George E. Tyson II Vice President and Treasurer	414 Nicollet Mall Minneapolis, MN 55401
Teresa S. Madden Vice President and Controller	414 Nicollet Mall Minneapolis, MN 55401

Cathy J. Hart Vice President and Secretary	414 Nicollet Mall Minneapolis, MN 55401
Dennis L. Koehl Vice President and Chief Nuclear Officer	414 Nicollet Mall Minneapolis, MN 55401

Nuclear Management Company, LLC

Directors

Name	Address
David M. Wilks	414 Nicollet Mall Minneapolis, MN 55401
David M. Sparby	414 Nicollet Mall Minneapolis, MN 55401

Principal Officers

Name	Address
David M. Wilks Chairman, President and Chief Executive Officer	414 Nicollet Mall Minneapolis, MN 55401
Charles R. Bomberger Vice President, Nuclear Projects	414 Nicollet Mall Minneapolis, MN 55401
Dennis L. Koehl Vice President and Chief Nuclear Officer	414 Nicollet Mall Minneapolis, MN 55401
Teresa S. Madden Vice President and Controller	414 Nicollet Mall Minneapolis, MN 55401
Cathy J. Hart Vice President and Secretary	414 Nicollet Mall Minneapolis, MN 55401
Michael C. Connelly Vice President and General Counsel	414 Nicollet Mall Minneapolis, MN 55401

Legal Counsel

Peter M. Glass	Xcel Energy 414 Nicollet Mall Minneapolis, MN 55401
David R. Lewis	Pillsbury Winthrop Shaw Pittman LLP 2300 N Street, NW Washington, DC 20037

1.3.5 Class of License, Use of Facility, and Period of Time for which the License is Sought

NMC requests renewal of the Class 104b operating licenses for the Prairie Island Nuclear Generating Plant (Facility Operating Licenses DPR-42 and DPR-60) for a period of 20 years beyond the expiration of the current license. This would extend the operating license for Unit 1 from midnight August 9, 2013, to midnight August 9, 2033 and for Unit 2 from midnight October 29, 2014 to midnight October 29, 2034.

This application includes a request for renewal of those NRC source material, special nuclear material, and by-product material licenses included within the current operating licenses and issued pursuant to 10 CFR Parts 30, 40 and 70.

The facility will continue to be known as the Prairie Island Nuclear Generating Plant.

1.3.6 Earliest and Latest Dates for Alterations, if Proposed

NMC does not propose to construct or alter any production or utilization facility in connection with this renewal application. The Current Licensing Basis (CLB) will be continued and maintained throughout the period of extended operation.

1.3.7 Listing of Regulatory Agencies Having Jurisdiction and News Publications

In addition to the Nuclear Regulatory Commission, the Federal Energy Regulatory Commission and the State of Minnesota Public Utilities Commission are the principal regulators of the company’s electric operations in Minnesota.

Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

News publications in circulation near PINGP which should be considered for public notices related to the application are as follows:

The Republican Eagle
2760 North Service Drive
Red Wing, MN 55066

The Saint Paul Pioneer Press
345 Cedar Street
St. Paul, MN 55101

The Star Tribune
425 Portland Avenue
Minneapolis, MN 55488-0002

Rochester Post-Bulletin
18 First Avenue, S.E.
Rochester, MN 55903-6118

Eau Claire Leader-Telegram
701 South Farwell Street
Eau Claire, WI 54701

Hastings Star - Gazette
741 Spiral Boulevard
Hastings, MN 55033

Pierce County Herald
126 South Chestnut Street
Ellsworth, WI 54011

1.3.8 Conforming Changes to Standard Indemnity Agreement

NMC requests that conforming changes be made to indemnity agreement No. B-60 for the Prairie Island Nuclear Generating Plant Units 1 and 2, as required, to ensure that the indemnity agreement continues to apply during both the terms of the current licenses and the terms of the renewed licenses. NMC understands that no changes may be necessary for this purpose if the current operating license numbers are retained.

1.3.9 Restricted Data Agreement

This application does not contain restricted data or other national defense information, nor is it expected that subsequent amendments to the license application will contain such information. However, pursuant to 10 CFR 54.17(g) and 10 CFR 50.37, NMC, as a part of the application for a renewed operating licenses, hereby agrees that it will not permit any individual to have access to, or any facility to possess, Restricted Data or classified National Security Information until the individual and/or facility has been approved for such access under the provisions of 10 CFR Parts 25 and/or 95.

1.4 Current Licensing Basis Changes During NRC Review

Each year, following the submittal of the PINGP License Renewal Application and at least three months before the scheduled completion of the NRC review, NMC will submit amendments to the PINGP application pursuant to 10 CFR 54.21(b). These revisions will identify any changes to the Current Licensing Basis that materially affect the contents of the License Renewal Application, including the USAR supplements.

1.5 Abbreviations

This section contains the abbreviations that pertain to the administrative and technical information within the LRA. The abbreviations that pertain to the environmental information are included as part of Appendix E (Environmental Report).

ACI	American Concrete Institute
ACSR	Aluminum Cable-Steel Reinforced
ADT	Aerated Drains Treatment
AEM	Aging Effect/Mechanism
AERM	Aging Effect Requiring Management
AF	Auxiliary Feedwater
AFW	Auxiliary Feedwater
AFWP	Auxiliary Feedwater Pump
AMP	Aging Management Program
AMR	Aging Management Review
AMSAC	ATWS Mitigating System Actuation Circuitry
AMSAC/DSS	ATWS Mitigating System Actuation Circuitry/Diverse Scram System
ANSI	American National Standards Institute
APC	Approach Canal
AR	Action Request
ART	Adjusted Reference Temperature
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing of Materials
ATWS	Anticipated Transients Without Scram
AWWA	American Water Works Association
AXB	Auxiliary Building
BL	Bleed Steam
BMI	Bottom Mounted Instrumentation
BTP	Branch Technical Position
BWR	Boiling Water Reactor
CASS	Cast Austenitic Stainless Steel
CC	Component Cooling
CCW	Component Cooling Water
CD	Condensate
CEA	Control Element Assembly
CF	Chemistry Factor

CFR	Code of Federal Regulations
CG	Miscellaneous Gas
CL	Cooling Water
CLB	Current Licensing Basis
CMAA	Crane Manufactures Association of America
CRD	Control Rod Drive
CRDM	Control Rod Drive Mechanism
CRGT	Control Rod Guide Tube
CRN	Cranes, Heavy Loads, and Fueling Handling System
CS	Containment Spray
CUF	Cumulative Usage Factor
C_VUSE	Charpy Upper-Shelf Energy
CW	Circulating Water
DBD	Design Basis Document
DBE	Design Basis Event
DE	Water Treatment
DG	Diesel Generators and Support
DGB	Diesel Generator Building
DOR	Division of Operating Reactors
EAF	Environmentally Assisted Fatigue
ECI	Emergency Cooling Water Intake
EDG	Emergency Diesel Generator
EFPY	Effective Full Power Years
EIC	Electrical and Instrumentation and Control
EOCI	Electric Overhead Crane Institute
EOL	End of Life
EPDM	Ethylene Propylene Diene Monomer
EPRI	Electric Power Research Institute
EQ	Environmental Qualification or Environmentally Qualified
EQML	Environmental Qualification Master List
EXT	External
FAC	Flow-Accelerated Corrosion
f’c	Minimum Strength of Concrete
Fen	Environmentally Assisted Fatigue Correction Factor
FERC	Federal Energy Regulatory Commission

FO	Fuel Oil
FOH	Fuel Oil Transfer House
FP	Fire Protection
FPB	Fire Protection Barriers
FSAR	Final Safety Analysis Report
FW	Feedwater
GALL	Generic Aging Lessons Learned
GDC	General Design Criterion
GEIS	Generic Environmental Impact Statement
GH	Guardhouse Ventilation
GSI	Generic Safety Issue
HC	Containment Hydrogen Control
HELB	High Energy Line Break
HEPA	High Efficiency Particulate
HGR	Component Supports
HS	Heating
HVAC	Heating, Ventilation and Air Conditioning
I&C	Instrumentation & Controls
IASCC	Irradiation-Assisted Stress Corrosion Cracking
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IGA	Intergranular Attack
IGSCC	Intergranular Stress Corrosion Cracking
INC	Intake Canal
INPO	Institute of Nuclear Power Operations
IPA	Integrated Plant Assessment
IR	Insulation Resistance
ISG	Interim Staff Guidance
ISI	Inservice Inspection
IWB	Requirements for Class 1 Components of Light-Water Cooled Power Plants
IWC	Requirements for Class 2 Components of Light-Water Cooled Power Plants
IWD	Requirements for Class 3 Components of Light-Water Cooled Power Plants
IWE	Requirements for Class MC and Metallic Liners of Class CC Components if Light-Water Cooler Power Plants

IWF	Requirements for Class 1, 2, 3, and MC Component Supports of Light-Water Cooled Power Plants
IWL	Requirements for Class CC Concrete Components of Light-Water Cooled Power Plants
LBB	Leak-Before-Break
LEFM	Leading Edge Flow Meter
LOCA	Loss-of-Coolant Accident
LRA	License Renewal Application
LTOP	Low-Temperature Overpressure Protection
MC	Metal Containment
MIC	Microbiologically-Influenced Corrosion
MRP	Materials Reliability Program
MS	Main Steam
MSIV	Main Steam Isolation Valve
MSS	Manufacturers Standardization Society
MUR-PU	Measurement Uncertainty Recapture - Power Uprate
MWt	Megawatt Thermal
NaOH	Sodium Hydroxide
NDE	Nondestructive Examination
NEI	Nuclear Energy Institute
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NESC	Institute of Electrical & Electronic Engineers National Electrical Safety Code
NMC	Nuclear Management Company
NPS	Nominal Pipe Size
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
NSAS	Non-Safety Affecting Safety
NSB	New Service Building
NSP	Northern States Power Company
NSSS	Nuclear Steam Supply System
NUMARC	Nuclear Utility Management and Resource Council
NUREG	Nuclear Regulation Document
OAD	Old Administration Building and Administration Building Addition

OCCW	Open Cycle Cooling Water
OE	Operating Experience
OPPS	Overpressure Protection System
OSB	Old Service Building
P-T	Pressure Temperature
PAC	Particulate, Absolute, Charcoal
PBD	Program Basis Document
PINGP	Prairie Island Nuclear Generating Plant
PORV	Power-Operated Relief Valve
PRT	Pressurizer Relief Tank
PS	Pressurizer
PTS	Pressurized Thermal Shock
PVC	Polyvinyl Chloride
PVDF	Polyvinylidene Fluoride
PWR	Pressurized Water Reactor
PWSCC	Primary Water Stress Corrosion Cracking
QA	Quality Assurance
RC	Reactor Coolant
RCCA	Rod Control Cluster Assembly
RCGVS	Reactor Coolant Gas Vent System
RCP	Reactor Coolant Pump
RCPB	Reactor Coolant Pressure Boundary
RCS	Reactor Coolant System
RCV	Reactor Containment Vessel
RD	Radiation Monitoring
RG	Regulatory Guide
RH	Residual Heat Removal
RHR	Residual Heat Removal
RPV	Reactor Pressure Vessel
RSG	Replacement Steam Generator
RT_{NDT}	Reference Temperature for Nil Ductility Transition
RT_{PTS}	Reference Temperature for Pressurized Thermal Shock
RV	Reactor Vessel
RVI	Reactor Vessel Internals
RVLIS	Reactor Vessel Level Instrument System
RWB	Radwaste Building
RWST	Refueling Water Storage Tank

RX	Reactor Internals
SA	Station and Instrument Air
SAMA	Severe Accident Mitigation Alternatives
SB	Stream Generator Blowdown
SBO	Station Blackout
SC	Structure and Component
SCBA	Self-Contained Breathing Apparatus
SCC	Stress Corrosion Cracking
SCH	Screenhouse
SE	Steam Exclusion
SER	Safety Evaluation Report
SF	Spent Fuel Pool Cooling
SFP	Spent Fuel Pool
SG	Steam Generator
SHB	Shield Building
SI	Safety Injection
SM	Plant Sample
SQUG	Seismic Qualification Utility Group
SRP	Standard Review Plan
SS	Stainless Steel
SSC	System, Structure, and Component
SSEL	Safe Shutdown Equipment List
TB	Turbine Generator and Support
TFN	Tank Foundations
TLAA	Time-Limited Aging Analysis
TRB	Turbine Building
TSC	Technical Support Center
U1	Unit 1
U2	Unit 2
USAR	Updated Safety Analysis Report
USE	Upper Shelf Energy
USI	Unresolved Safety Issue
UV	Ultraviolet
VC	Chemical and Volume Control
VCT	Volume Control Tank
VT	Visual Examination
WCAP	Westinghouse Commercial Atomic Power
WD	Waste Disposal

WO	Work Order
WOG	Westinghouse Owners Group
ZA	Auxiliary and Radwaste Area Ventilation
ZB	Turbine and Administration Building Ventilation
ZC	Primary Containment Ventilation
ZG	Diesel Generator and Screenhouse Ventilation
ZN	Control Room and Miscellaneous Area Ventilation

1.6 Communications

Written communications on this application should be directed to:

Mr. Michael D. Wadley
Site Vice President
Prairie Island Nuclear Generating Plant
1717 Wakonade Dr East
Welch, MN 55089

With copies to:

Mr. Kenneth J. Albrecht
Director Major Projects
Nuclear Management Company, LLC
414 Nicollet Mall
Minneapolis, MN 55401

Mr. Eugene F. Eckholt
License Renewal Project Manager
Prairie Island Nuclear Generating Plant
1717 Wakonade Dr East
Welch, MN 55089

Mr. Peter M. Glass
Assistant General Counsel
Xcel Energy
414 Nicollet Mall
Minneapolis, MN 55401

David R. Lewis
Pillsbury Winthrop Shaw Pittman LLP
2300 N Street, NW
Washington, DC 20037

Section 1.0 References

1. 10 CFR 54, Requirements for Renewal of Operating Licenses for Nuclear Power Plants, U.S. Nuclear Regulatory Commission.

2. 10 CFR 51, Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions, U.S. Nuclear Regulatory Commission.

3. NEI 95-10, Industry Guideline for Implementing the Requirements of 10 CFR Part 54 -The License Renewal Rule, Rev. 6, Nuclear Energy Institute.

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

5. NUREG-1800, Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants, U.S. Nuclear Regulatory Commission, Revision 1, September 2005.

6. NUREG-1801, Generic Aging Lessons Learned (GALL) Report, U.S. Nuclear Regulatory Commission, Revision 1, September 2005.

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

2.1 Scoping and Screening Methodology

The LRA presents the results of an Integrated Plant Assessment (IPA) that fulfills the requirements of 10 CFR Part 54.21. 10 CFR Part 54.3, "Definitions," defines the IPA as:

> *Integrated Plant Assessment (IPA) is a licensee assessment that demonstrates that a nuclear power plant facility's structures and components requiring aging management review in accordance with [10 CFR] 54.21 (a) for license renewal have been identified and that the effects of aging on the functionality of such structures and components will be managed to maintain the CLB [Current Licensing Basis] such that there is an acceptable level of safety during the period of extended operation.*

For systems, structures and components (SSCs) within the scope of License Renewal, 10 CFR 54.21(a)(1) requires the License Renewal applicant to identify and list the structures and components (SCs) subject to an AMR. 10 CFR 54.21(a)(2) further requires that the methods used to implement the requirements of 10 CFR 54.21(a)(1) be described and justified.

This section of the application provides a description and justification of the methodology used to identify and list structures and components at PINGP that are within the scope of License Renewal and subject to an AMR.

2.1.1 **License Renewal Process Overview**

Scoping and screening at PINGP has been performed to be consistent with the requirements of 10 CFR 54, the Statements of Consideration related to the License Renewal Rule, and the guidance provided in NEI-95-10 (Reference 1). The scoping step in the PINGP License Renewal process identified the plant SSCs that were within the scope of 10 CFR Part 54. The screening step of the License Renewal process identified and listed those in-scope structures and components that were subject to an AMR.

This section provides information pertaining to the documentation used to perform scoping and screening (Section 2.1.1.1); the License Renewal tools used during the process (Section 2.1.1.2); License Renewal Interim Staff Guidance (ISG) document considerations (Section 2.1.1.3); Generic Safety Issue (GSI) considerations (Section 2.1.1.4); and consideration of other PINGP Licensing actions (Section 2.1.1.5). Section 2.1.2 provides a detailed description of the scoping process and Section 2.1.3 provides a detailed description of the screening process. An overview of the PINGP scoping and screening process is depicted in Figure 2.1-1.

2.1.1.1 Plant Information Sources

A number of different information sources were utilized in the scoping and screening process performed at PINGP. They are discussed here as background information for the scoping and screening process.

2.1.1.1.1 Current Licensing Basis

10 CFR Part 54.3 defines the CLB. The CLB for PINGP has been defined in accordance with this guidance. The CLB includes the USAR, Technical Specifications, and the commitments contained in docketed licensing correspondence with the NRC which are in effect.

2.1.1.1.2 Design Basis Events (DBEs)

DBEs are defined in 10 CFR 50.49(b)(1) as conditions of normal operation, including anticipated operational occurrences, design basis accidents, external events, and natural phenomena for which the plant must be designed to ensure the functions identified in 10 CFR 54.4(a)(1)(i) through (iii) are maintained.

The DBEs considered are those contained in the PINGP CLB and principally in the PINGP USAR. USAR Chapter 14 provides the accident analyses for many of the PINGP DBEs. These analyses address both design operational transients, and design basis accidents for which the plant must be designed. The remaining sections of the USAR also contain evaluations of operational events, external events and natural phenomena for which the plant must be designed.

Additional information regarding many of the DBEs can be found in the PINGP Design Basis Documents (DBDs). The PINGP DBDs cover a number of support and accident mitigation systems, selected licensing topical issues, and accident analyses. DBDs are a tool to help explain the requirements behind the design basis for selected systems and topics and complement the information obtained from other CLB sources. The DBDs provide references to CLB source documents. However, DBDs are not CLB documents, and were not used as a reference CLB source document.

2.1.1.1.3 Plant Equipment Database

The plant maintains a controlled equipment database used for managing design and maintenance information associated with plant SSCs. The plant equipment database electronically stores essential information on PINGP equipment. The plant equipment database includes information on component material, seismic classification, Quality Assurance (QA) classification, and location. The database also identifies component special concerns including relationships with the Fire Protection Program, Environmental Qualification (EQ) Program, or Station Blackout (SBO) implementation. Data from the plant equipment database, including design-related and maintenance-related information, was used to populate the License Renewal database (see Section 2.1.1.2.1).

2.1.1.1.4 Quality Classifications

The NMC Quality Assurance Topical Report (Reference 2) specifies that a list, or other means of identification, of safety related systems, structures, and components under the control of the Quality Assurance Program is established and maintained for each operating plant. At PINGP, the Q-List and the Q-List Extension, which are controlled by plant procedures, specify the Quality Assurance Program boundaries for systems, structures, and components.

The Q-List defines the SSCs subject to the requirements of 10 CFR 50, Appendix B. The Q-List Extension further identifies safety related and non-safety related sub-structures, sub-systems, and component parts of Q-Listed items. This information is contained in the plant equipment database.

The Q-List and Q-List Extension are used to code items, as safety related in the plant equipment database and include SSCs relied upon to remain functional during and/or following a design basis accident or transient to ensure:

- The integrity of the Reactor Coolant System pressure boundary; or
- The capability to shutdown the reactor and maintain it in a safe condition; or
- The capability to prevent or mitigate the consequences of accidents which could result in offsite exposures comparable to the guidelines of 10 CFR 100.

A project is underway at PINGP to review the safety classification of plant systems and components as specified in the Q-List to confirm the safety classifications. Available completed Q-List Project System Functional Evaluation Reports, the Upgrade/Downgrade List, and marked up P&IDs were considered when performing the scoping and screening. Components with pending quality classification changes were also evaluated to confirm the License Renewal scoping results.

2.1.1.1.5 Other Information Sources

Other information sources were also used in performing License Renewal system and structure evaluations. These include:

- Controlled Drawing File
- Industry Codes, Standards, and Regulations
- NRC Docketed Correspondence and Documents
- Technical Correspondence, Analyses, and Reports
- Calculations
- Modifications and Alterations
- Nuclear Steam Supply System Supplier, Architect-Engineer, Vendor Reports, Specifications, and Drawings

Plant drawings are controlled in accordance with an NMC fleet procedure. Drawings are a key resource for performing system, structure, and component evaluations for License Renewal.

2.1.1.2 License Renewal Tools

2.1.1.2.1 License Renewal Database

A License Renewal database was used as a tool to conduct scoping, screening, and AMRs. The database served as an information repository for SSC evaluations, and provided a platform for data sorting and consolidation. The database is consistent with the process guidance in NEI 95-10 and the process requirements of 10 CFR 54. The information presented in the LRA was extracted from various License Renewal Project technical reports and not directly from the database itself.

2.1.1.2.2 License Renewal Database Population

Initial population of the License Renewal database was completed in December 2005. The database was populated with PINGP SSCs listed in the controlled plant equipment database including select equipment and system data, and design and maintenance related information. The License Renewal database was periodically updated during the PINGP License Renewal Project.

2.1.1.3 Interim Staff Guidance (ISG) Discussion

License Renewal guidance documents, such as the Standard Review Plan for License Renewal (NUREG-1800) (Reference 3), Generic Aging Lessons Learned

(GALL) Report (NUREG-1801) (Reference 4), Regulatory Guide 1.188 (Reference 5), and NEI 95-10 have been developed to enhance the LRA process. As lessons are learned during the NRC review of LRAs, the NRC expects that these guidance documents may need to be revised to capture new insights or address emerging issues. To document these lessons learned, the NRC developed an Interim Staff Guidance (ISG) process that involves the industry and other stakeholders. The ISG process provides interim guidance to future License Renewal applicants, and other interested stakeholders, until the emerging issues are incorporated into the next revision of the License Renewal guidance documents.

As discussed in NEI 95-10, the NRC encourages applicants for License Renewal to address ISGs in their LRA. ISGs have been provided for a number of License Renewal issues that affect scoping and screening as well as aging management. However, with the exception of the ISGs discussed in the following paragraphs, the previous ISGs were resolved and closed with the issuance of Revision 1 of the NRC License Renewal guidance documents (i.e., NUREG-1800, NUREG-1801, and Regulatory Guide 1.188) and Revision 6 of NEI 95-10. Where necessary, additional guidance was incorporated into these revised guidance documents. A discussion of each of the open ISGs, and their applicability to the PINGP LRA follows.

1. LR-ISG-19B — Proposed Aging Management Program XI.M11-B, Nickel-Alloy Base-Metal Components and Welds in the Reactor Coolant Pressure Boundary

   The NRC License Renewal website indicates this ISG is under NRC development. The Nuclear Energy Institute and EPRI - Materials Reliability Program (MRP) are to develop an augmented inspection program for NUREG-1801, AMP XI.M11-B.

   The PINGP Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program manages aging effects on the reactor head penetrations. With respect to the management of Nickel-Alloy Nozzles and Penetrations not associated with the reactor vessel head penetration nozzles, a commitment is provided in Appendix A [Section A2.27] of this application to: (1) comply with applicable NRC orders, and (2) implement applicable NRC Bulletins, Generic Letters, and staff-accepted industry guidelines. As this issue evolves under the existing regulatory process, these programs will be modified in response to industry initiatives and NRC guidance and requirements.

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

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

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

   This ISG was issued for comment by the NRC on February 8, 2007, and the comment period has ended. The Environmental Report provided as part of Appendix E of this application was prepared in accordance with the guidance of Supplement 1 to Regulatory Guide 4.2, “Preparation of Supplemental Environmental Reports for Applications to Renew Nuclear Power Plant Operating Licenses.” The draft LR-ISG-2006-02 was also considered during the preparation of the Environmental Report.

4. LR-ISG-2006-03 Staff Guidance for Preparing Severe Accident Mitigation Alternatives (SAMA) Analyses

   LR-ISG-2006-03 was issued by the NRC as final on August 2, 2007. It is applicable to PINGP. With the issuance of LR-ISG-2006-03, the NRC endorsed the guidance of NEI 05-01, “Severe Accident Mitigation Alternatives (SAMA) Analysis Guidance Document,” in the development of SAMA analyses. The PINGP 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 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

   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”

   Proposed LR-ISG-2007-02 was issued for public comment by the NRC on September 6, 2007. PINGP has committed to a new Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification

Requirements Program. This program will be consistent with NUREG-1801 as it is modified by the September 6, 2007 proposed revision to LR-ISG-2007-02.

7. Draft LR-ISG-2008-01 Staff Guidance Regarding the Station Blackout Rule (10 CFR 50.63); Associated With License Renewal Applications

On March 12, 2008, the NRC published draft LR-ISG-2008-01 in the Federal Register (73FR13258) for public comment. The contents of this ISG are being reviewed by the nuclear industry. When the final guidance on this subject is issued by the NRC, the LRA will be reviewed and updated as necessary.

2.1.1.4 Generic Safety Issues (GSIs)

In accordance with the guidance in NEI 95-10 and Appendix A.3 (Branch Technical Position RLSB-2) of NUREG-1800, review of NRC Unresolved Safety Issues (USI) and Generic Safety Issues (GSI) is required as part of the License Renewal process to satisfy the finding required by 10 CFR 54.29. This guidance specifies that USIs and GSIs that involve issues related to the License Renewal AMR or TLAA evaluations should be addressed in the LRA.

Consistent with the guidance of Sections A.3.2.1.1 and A.3.2.1.2 of Appendix A.3 of NUREG-1800, Appendix B of NUREG-0933, “A Prioritization of Generic Safety Issues” (through Supplement 31, dated September 2007) (Reference 6) was reviewed to identify the Unresolved Safety Issues (USIs), and High and Medium priority issues. That review resulted in the identification of three GSIs which met the criteria of Appendix A of NUREG-1800 and which must be addressed in the LRA. Summaries of those GSIs are provided below.

1. GSI-156.6.1, Pipe Break Effects on Systems and Components

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 AMR tables associated with mechanical systems in Section 3.0. PINGP CLB High Energy Line Break (HELB) pipe break and crack location criteria require selecting the terminal ends of the piping run and any locations along the pipe where the combined stress exceeds the established criteria. Since the postulation of HELB does not involve time-limited assumptions defined by the current operating term (i.e. fatigue cumulative usage factors are not used as a basis for postulating HELB), the postulation of pipe breaks is not a TLAA.

2. GSI-163, Multiple Steam Generator Tube Leakage

   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 AMR and TLAA evaluation as documented in Section 3.1 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.

3. GSI-191, Assessment of Debris Accumulation on PWR Sump Performance

   GSI-191 addresses the potential for blockage of containment sump strainers that filter debris from water supplied to the emergency core cooling system pumps following a postulated loss-of-coolant accident (LOCA). The NRC has addressed this issue in Regulatory Guide 1.54 (Reference 7), Generic Letter 2004-02 (Reference 8), Generic Letter 98-04 (Reference 9) and other communications. The issue is based on containment sump strainer design and on the identification of new potential sources of debris, including failed containment coatings that have the potential to block the sump strainers.

   PINGP has replaced the containment sump strainers (containment sump B strainers) in both Units in response to the GSI-191 concerns. The replacement containment sump B strainers are the subject of an AMR as documented in Section 3.2.

   PINGP does not credit coatings inside the containment to assure that the intended functions of coated structures and components are maintained. The contribution of coatings to containment debris is event driven and is not related to aging. Therefore, those coatings do not have an intended function. In addition, the issue is not related to the 40-year term of the current operating license; and therefore, is not a TLAA.

2.1.1.5 Consideration of Other PINGP Licensing Actions

2.1.1.5.1 Measurement Uncertainty Recapture - Power Uprate

A Measurement Uncertainty Recapture - Power Uprate (MUR-PU) License Amendment Request for PINGP Units 1 and 2 is expected to be submitted during the NRC review of the LRA. The MUR-PU results in a small increase in the licensed core thermal power that is enabled through the use of more accurate feedwater flow measurement techniques. A review of the interaction between the MUR-PU and the LRA has been completed, with the following results:

- Scoping: The MUR-PU project scope includes the installation of improved feedwater flow measurement instrumentation. No additional SSCs beyond those associated with the feedwater flow instrumentation are being affected, and no intended functions are modified or added for existing SSCs. If the components associated with the MUR-PU are placed in service prior to NRC issuance of the renewed operating license, affected sections of the LRA, if any, will be updated as part of the LRA annual update required by 10 CFR 54.21(b).
- Screening: The MUR-PU does not change the component screening results (i.e., no currently active components were made passive as a result of the MUR-PU). If modified or new components resulting from the MUR-PU are placed in service prior to NRC issuance of the renewed operating license, affected sections of the LRA, if any, will be updated as part of the LRA annual update required by 10 CFR 54.21(b).
- Aging Management Review: The implementation of the MUR-PU will not introduce new aging effects or mechanisms. The AMRs performed to support the LRA bound the expected environmental conditions following the MUR-PU.
- Aging Management Programs: The aging management program descriptions provided in the LRA are not affected by a change to the rated thermal power level from the MUR-PU.
- Time-Limited Aging Analysis: The TLAA conclusions provided in the LRA will remain valid for the MUR-PU conditions. If there are changes in radiation levels significant enough to affect the qualification analyses for environmentally qualified equipment, any necessary analysis updates would be managed by the Environmental Qualification of Electrical Components Program.

2.1.1.5.2 Fuel Transition

A License Amendment Request requesting NRC approval for the transition to a new fuel type for use in PINGP Units 1 and 2 reactors is expected to be submitted concurrent with the NRC review of the LRA. A review of the affect of the transition to a new fuel type on the LRA has been completed, with the following results:

- Scoping: The transition to a new fuel type will have no effect on the application of the system scoping criteria or the results of system scoping.

The transition to a new fuel type adds no new SSCs and no intended functions are modified or added for existing SSCs.

- Screening: The transition to a new fuel type will not change the component screening results (i.e., no currently active components are made passive as a result of the fuel transition). The screening process is unaffected by the fuel type.
- Aging Management Review: The transition to a new fuel type will not introduce new aging effects or mechanisms. The AMRs performed to support the LRA bound the environmental conditions expected following implementation of the new fuel type.
- Aging Management Programs: The aging management program descriptions provided in the LRA are not affected by the transition to a new fuel type.
- Time-Limited Aging Analysis: The TLAA conclusions provided in the LRA will remain valid following implementation of the new fuel type.

2.1.2 Scoping Process Methodology

Section 54.4 of the rule states that:

(a) Plant systems, structures, and components within the scope of this part 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 Part 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 10 CFR 50.34(a)(1), 10 CFR 50.67(b)(2), or 10 CFR 100.11 of this chapter, as applicable.

(2) All non-safety 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).

(b) *The intended functions that these systems, structures, and components must be shown to fulfill in 10 CFR 54.21 are those functions that are the bases for including them within the scope of License Renewal as specified in paragraphs (a)(1) - (3) of this section.*

2.1.2.1 **Scoping Process Overview**

The scoping process categorized the entire plant in terms of SSCs and commodity groups with respect to License Renewal. SSC and commodity group functions were identified and evaluated against criteria provided in 10 CFR Part 54.4 (a)(1), (2), and (3) to determine whether the item should be considered within the scope of License Renewal. This identified SSCs that are safety related and perform or support an intended function for responding to a design basis event; are non-safety related and whose failure could prevent accomplishment of a safety related function; or support a specific requirement for one of the five regulated events applicable to License Renewal.

Even if only a portion of an SSC or commodity fulfilled a scoping criterion, the item was identified as in-scope for License Renewal and received further evaluation. Those SSCs or commodities identified as not meeting any scoping criterion were not further processed.

The scoping methodology utilized by PINGP is consistent with the guidance provided by the NRC in NUREG-1800, by the industry in NEI 95-10, and by NRC Interim Staff Guidance.

Existing plant documentation was used for this review, including the PINGP Current Licensing Basis documents, controlled drawings, and the plant equipment database. Systems and components from the plant equipment database were included in the License Renewal database population. Components in the plant equipment database were reviewed to ensure systems, components, and commodity groups having a potential to be considered in-scope for License Renewal were not omitted. Additionally, plant walkdowns were conducted as necessary.

In addition to the plant equipment database, the PINGP Piping and Instrument Diagrams (P&IDs) and other controlled drawings were used to identify components required to support system level and structure level License Renewal functions. These components were included in-scope for License Renewal. In addition to the License Renewal database, results of this scoping effort were documented on License Renewal Boundary Drawings.

Once the systems, structures and commodity groups were identified as being in-scope, the systems and structures were moved to component and commodity level scoping and then to the screening process.

2.1.2.2 System/Structure/Component/Commodity and Asset Group Identification

Systems

Plant systems are identified within the plant equipment database using system identifiers. In addition, other PINGP sources were reviewed to identify plant systems which were not included in the plant equipment database. For License Renewal activities, plant systems were consolidated into License Renewal systems based on related functions or function dependencies. This consolidates the plant systems to be evaluated and bounds them in a manner that is consistent with the systems described in NUREG-1801. The License Renewal systems were developed from, and account for, the PINGP systems identified in the plant equipment database and other sources.

Structures

The plant equipment database lists a portion of the Civil/Structural SSCs. The remaining Civil/Structural SSCs were identified from the CLB, USAR, site walkdowns and plant drawings, and were added to the License Renewal Database to provide a basis for the review of the containments, structures and component supports during the scoping and screening process.

Commodity Groups

Commodity groups were utilized when component evaluations were best performed by component type, rather than by system or structure. Commodity groups were established for components that were constructed from similar materials, exposed to similar environments, or performed similar intended functions regardless of the specific PINGP system or structure to which they were assigned.

Commodity group components were not associated with a specific system or structure during the component's evaluation, but with their assigned commodity group (e.g., fire protection barriers, cables and connections, and component supports). Evaluation of each commodity group took place as if it were a separate, individual system. Commodity groups were utilized for electrical and instrumentation and control (EIC) and structural components.

Asset Groups

Asset groups were used to represent components within a License Renewal system not tracked by a unique tag number within the plant equipment database (such as instrument manifolds, thermowells, fasteners, etc.). In addition, for components with a unique tag number within the plant equipment database, asset groups were used where it was deemed efficient to process a single component type as one asset within a system rather than many individual components having the same construction and function. For example, piping components, which are identified with unique tag/line numbers in the plant equipment database, were grouped within representative piping asset groups to identify the in-scope piping for each system. The piping was uniquely identified as in or out of scope on the License Renewal Boundary Drawings.

Components

Components in the plant equipment database were input to the License Renewal database. Additional components were added to the License Renewal database when necessary.

2.1.2.3 SSC Functions

Numerous sources, including the USAR, docketed correspondence with the NRC, Maintenance Rule documents, and Design Basis Documents provided information on system level and structure level functions. Documentation of references used in this process was included for each function.

A list of functions was developed for systems, structures, and commodity groups at PINGP. The functions were evaluated against the criteria specified in 10 CFR 54.4 (a)(1), (2), or (3). This process included identification of all system level and structure level functions. If any of the functions met any of the criteria specified in 10 CFR Part 54.4 (a)(1), (2), or (3), then the associated system, structure, or commodity group was considered to be within the scope of License Renewal. This included structures whose only function is to support or house in-scope systems/components, or to remain intact.

Once system level and structure level functions were identified, the plant equipment database and other information sources were used to identify component functions and determine if these functions were in-scope for License Renewal. The same scoping criteria applied at the system and structure level is applicable at the component level. Component intended functions are defined as a specific function of a component that supports a system intended function. The intended functions used in this process for PINGP are defined in Table 2.1-1.

The critical element of scoping is to ensure that SSCs that perform License Renewal intended functions are identified and that the basis for this determination is clearly documented.

When the only components performing a License Renewal intended function in a system were evaluated as in-scope commodities (e.g., fire protection barriers, cables and connections, and component supports), the remaining portion of the system was not considered within scope of License Renewal. For example, a non-safety related ventilation system contains components that act as fire protection barriers (fire dampers). If, within the system evaluation boundary, no other functions performed by the system are License Renewal intended functions, then the system components that perform the fire barrier function are assigned to the fire barrier commodity group and are considered within the scope of License Renewal. The non-safety related ventilation system, absent the fire dampers, is designated as not within the scope of License Renewal, since it performs no License Renewal intended function.

2.1.2.4 Application of License Renewal Scoping Criterion

2.1.2.4.1 Scoping Criterion 1 - Safety Related SSCs

The PINGP definition of safety related SSCs within the CLB is not completely consistent with the scoping criteria under 10 CFR 54.4(a)(1), and therefore the scoping methodology used at PINGP followed the criteria under 10 CFR 54.4(a)(1) and not the PINGP definition. The significant difference between the PINGP CLB definition of safety related and the Rule is the CLB applicability to design basis accidents versus the broader Rule applicability to design basis events. The other difference is in the applicability of exposure guidelines; in addition to the guidelines of 10 CFR 100, 10 CFR 54.4(a)(1)(iii) references the dose guidelines of 10 CFR 50.34(a)(1) and 10 CFR 50.67(b)(2). For plants (including PINGP) with construction permits issued before January 10, 1997, 10 CFR 50.34(a)(1) refers to the guidelines of 10 CFR 100, which are included in the PINGP definition of safety related. The exposure guidelines of 10 CFR 50.67(b)(2) address the alternate source term, which PINGP has credited only for the refueling accident analysis. A review was performed of the systems and components that were credited in this limited use of 10 CFR 50.67 to ensure the applicable SSCs were included in the scope of License Renewal.

As described in Section 2.1.2.3, SSC and commodity group functions were identified using a number of information sources. These functions were compared to scoping Criterion 1 to identify those that should be considered in-scope for License Renewal for PINGP DBEs, regardless of their current classification in the plant equipment database or supporting Q-List information sources. To confirm the function scoping, results were compared to the current component quality classifications and differences were evaluated.

2.1.2.4.2 Scoping Criterion 2 - Non-Safety Related Affecting Safety Related

SSCs meeting scoping Criterion 2 for PINGP are included in one of the following three categories:

- The plant's Current Licensing Basis (CLB). The PINGP CLB was used to identify non-safety related SSCs that have the potential to prevent satisfactory accomplishment of safety related SSC intended functions, and therefore are within the scope of License Renewal for 10 CFR 54.4(a)(2).
- Non-safety related SSCs directly connected to safety related SSCs (typically piping systems) up to and including the first seismic or equivalent anchor past the safety/non-safety interface are within the scope of License Renewal for 10 CFR 54.4(a)(2).
- Non-safety related SSCs that are not directly connected to safety related SSCs, or are connected downstream of the first seismic or equivalent anchor past the safety/non-safety interface, but have a potential spatial interaction such that their failure could adversely impact the performance of a safety related SSC intended function, are within the scope of License Renewal for 10 CFR 54.4(a)(2).

SSCs meeting scoping Criterion 2 in the first two categories were identified during document reviews including the USAR, plant drawings, design documents, piping analyses, plant equipment database, and other CLB documents. SSCs in the third category were identified by both document reviews and plant walkdowns to identify possible spatial interactions meeting the broader criteria established for License Renewal.

The following sections briefly summarize, for each of these three cases, the determination of which PINGP non-safety related SSCs were considered within the scope of License Renewal per 10 CFR 54.4(a)(2). The detailed evaluations and results are described in project documents.

1) Non-Safety Related SSCs Identified in the CLB

SSCs in this category were identified by reviewing the USAR, plant drawings, design documents, plant equipment database, and other CLB documents. The following paragraphs describe each situation identified in the CLB where non-safety related SSCs were identified to have the potential to prevent satisfactory accomplishment of safety related SSC intended functions.

a. Missiles

Missiles can be generated from internal or external events such as failure of rotating equipment and tornados. Inherent non-safety related features that protect safety related equipment from missiles were considered to meet the criteria of 10 CFR 54.4(a)(2) and are within the scope of License Renewal.

b. Cranes

Load-handling systems, from which a load drop could result in damage to any system that could prevent the accomplishment of a safety related SSC intended function, were considered to meet the criteria of 10 CFR 54.4(a)(2) and are within the scope of License Renewal.

c. Flooding

Walls, curbs, dikes, doors, etc. that provide flood barriers to safety related SSCs were considered to meet the criteria of 10 CFR 54.4(a)(2) and are within the scope of License Renewal. Level instrumentation and alarms or non-safety related sump pumps, piping and valves required to mitigate the effects of a flood that threaten safety related SSCs intended functions, are also within the scope of License Renewal per 10 CFR 54.4(a)(2).

d. High Energy Line Break

PINGP defines high energy piping systems as those having a service temperature of 200^{o}F and above and a design pressure above 275 psig. Even if the PINGP HELB analysis assumed that a non-safety related high energy piping system did not fail or assumed failure only at specific locations, the entire piping system was considered to meet the criteria of 10 CFR 54.4(a)(2) and is within the scope of License Renewal.
Non-safety related whip restraints, jet impingement shields, etc. that are designed and installed to protect safety related equipment from the

effects of a HELB, are also within the scope of License Renewal per 10 CFR 54.4(a)(2).

e. NRC Generic Letter 87-02 (SQUG) Response

The NMC response to Generic Letter 87-02, Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors - Unresolved Safety Issue (USI) A-46, followed the methodology developed by the Seismic Qualification Utility Group (SQUG). The SQUG methodology entails system analysis to select a subset of plant systems and equipment (components) necessary to achieve and maintain safe shutdown from a normal plant operating condition assuming a loss of offsite power. This subset was used to create a Safe Shutdown Equipment List (SSEL). Seismic review and/or relay evaluation was then conducted as applicable to ensure the adequacy of selected safe shutdown systems and equipment following a Safe Shutdown Earthquake. The equipment identified in the SSEL not already within the scope of License Renewal for 10 CFR 54.4(a)(1) is within the scope of License Renewal for 10 CFR 54.4(a)(2) to meet the NMC response to Generic Letter 87-02.

2) Non-Safety Related SSCs Directly Connected to Safety Related SSCs

For non-safety related SSCs directly connected to safety related SSCs (typically piping and duct systems), the non-safety piping and supports, up to and including the first seismic or equivalent anchor beyond the safety/non-safety interface, are within the scope of License Renewal per 10 CFR 54.4(a)(2). As an alternative to specifically identifying a seismic anchor or series of equivalent anchors, a bounding approach was typically used which includes enough of the non-safety piping run to ensure these anchors are included and thereby ensure the piping and anchor intended functions are maintained. The application of this approach is discussed in detail in project documents.

For piping and ducting systems in specific cases where use of the bounding approach was not desirable, then the non-safety piping and supports beyond the safety related/non-safety interface were considered to be in scope for 10 CFR 54.4(a)(2) up to and including the first seismic or equivalent anchor (i.e., device, equipment or structure that ensures that forces and moments are restrained in three orthogonal directions). Where a seismic or equivalent anchor was not clearly described, a combination of restraints and supports were used such that the non-safety piping and associated structures and components attached to safety related piping are included in scope up to a boundary point that encompasses at least two (2) supports in each of three (3) orthogonal directions.

Non-safety related SSCs considered to be in scope for 10 CFR 54.4(a)(2) using the criteria described above were marked “in License Renewal Boundary” in the License Renewal database and highlighted “In Scope” on the License Renewal Boundary Drawings.

3) Non-Safety Related SSCs Not Directly Connected to Safety Related SSCs

For non-safety related SSCs that are not directly connected to safety related SSCs, or are connected downstream of the first seismic or equivalent anchor past the safety/non-safety interface, the non-safety related SSCs may be in scope if their failure could prevent the performance of the system safety function for which the safety related SSC is required. To determine which non-safety related SSCs may be in scope for 10 CFR 54.4(a)(2), either of the following two options were used.

<u>Mitigative Option</u>

The mitigative option was utilized to exclude areas from NSAS scoping. Areas were excluded provided they did not contain any 10 CFR 54.4(a)(1) components and there are mitigative features that would prevent spatial interaction (such as spray, leakage or flooding) outside of the excluded area. Where the mitigative option is used to exclude areas from NSAS scoping, the mitigative features are within the scope of License Renewal per 10 CFR 54.4(a)(2) and non-safety systems within these areas can be excluded from the scope of License Renewal. These mitigative features are typically associated with the structures and are further evaluated in the Civil/Structural AMRs. However, non-safety related SSCs directly connected to safety related SSCs remain in scope for License Renewal in accordance with Section 2.1.2.4.2.2 even if these are partly or wholly located within exclusion areas.

In addition, mitigative features currently credited in the CLB are included in the scope of License Renewal for 10 CFR 54.4(a)(2) for providing a mitigative function. Guard pipes, jet impingement shields and pipe whip restraints are evaluated with the structures where they reside and are assumed to be within the scope of License Renewal for 10 CFR 54.4(a)(2).

Preventive Option

The preventive option utilized in the PINGP License Renewal process identifies non-safety related SSCs that have a spatial interaction (pipe whip, physical impacts due to high energy system piping falling due to flow accelerated corrosion failures, jet impingement and spray, drip or flooding from the non-safety related system) that could create additional failures of the safety related SSCs.

Non-Safety Related SSC Containing Air/Gas

- Industry and site specific operating experience reviews confirm that no failures due to aging of non-safety related SSCs containing air/gas have adversely impacted the satisfactory accomplishment of an Intended function. Therefore non-safety related piping containing air/gas and non-safety related ventilation ductwork are not in scope for 10 CFR 54.4 (a)(2). However, collapse of non-safety related piping or ductwork onto safety related SSC could adversely impact the satisfactory accomplishment of an intended function. To address this concern, all non-safety related component supports in structures that house 10 CFR 54.4(a)(1) SSCs are included within the scope of License Renewal for 10 CFR 54.4(a)(2).

Non-Safety Related SSC Containing Liquid and Steam

- SSCs containing liquids or steam, including high energy, moderate and low energy systems, and located in structures housing 10 CFR 54.4(a)(1) SSCs are assumed to have a spatial interaction unless excluded by the mitigative option. Therefore, these SSC, along with associated component supports, are included within the scope of License Renewal for 10 CFR 54.4(a)(2).

Non-Safety Related Supports for Mechanical and Electrical Components

- To address non-seismic and seismic II/I concerns, component supports associated with non-safety related mechanical and electrical components such as conduit, cable tray, tubing, junction boxes, panels, cabinets, racks, mechanical and electrical equipment housings, non-ASME components, etc. located in structures housing 10 CFR 54.4(a)(1) SSCs are included within the scope of License Renewal for 10 CFR 54.4 (a)(2).

All Non-Safety Related SSC

- Non-safety related SSC not already included in the scope of License Renewal in accordance with the above methodology, were further evaluated to identify those that perform a function necessary to the satisfactory accomplishment of a safety related intended function. Those that do perform such a function were included in the scope of License Renewal for 10 CFR 54.4 (a)(2). This evaluation utilized plant-specific and industry operating experience to identify such SSC and was conducted at the same level as that performed to support the CLB. Equipment required to establish initial conditions for equipment operation or accident assumptions, and equipment malfunctions which would challenge safety related SSCs, but not prevent the accomplishment of an intended function, are not included within the scope of License Renewal for 10 CFR 54.4(a)(2).

Non-safety related SSCs considered to be in scope for 10 CFR 54.4(a)(2) using the process described above were marked “in License Renewal Boundary” in the License Renewal database and highlighted “In Scope” on the License Renewal Boundary Drawings where applicable.

2.1.2.4.3 Scoping Criterion 3 - SSCs Required by Other Regulations Identified in 10 CFR Part 54

SSCs credited in safety analysis or plant evaluations for performing functions that demonstrate compliance with the following regulations are within the scope of License Renewal for 10 CFR 54.4(a)(3).

1) Fire Protection (10 CFR Part 50.48)
2) Environmental Qualification (10 CFR Part 50.49)
3) Pressurized Thermal Shock (10 CFR Part 50.61)
4) Anticipated Transients Without Scram (10 CFR Part 50.62)
5) Station Blackout (10 CFR Part 50.63)

Reviews were performed to identify SSCs that would be in-scope for License Renewal per 10 CFR 54.4(a)(3). The results of these reviews were documented in Technical Reports and incorporated into the License Renewal database. The following discussion describes the methodology used in this review:

1) Fire Protection (FP)

   Consistent with the requirements specified in 10 CFR 54.4(a)(3), all SSCs relied upon to perform a function that demonstrates compliance with the regulations for fire protection (10 CFR 50.48) are within the scope of License Renewal. The scope of 10 CFR 50.48 goes beyond the protection of safety related equipment. According to NUREG-0800, Section 9.5.1, Fire Protection Program, equipment required for compliance with 10 CFR 50.48 also includes FP SSCs relied on to minimize the effects of a fire and to prevent the release of radiation to the environment. SSCs required to comply with 10 CFR 50, Appendix R, Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979, and with commitments to Appendix A to Branch Technical Position (BTP) APCSB 9.5-1, “Fire Protection for Nuclear Power Plants,” as documented in NUREG-0800, are within the scope of License Renewal.

The Safe Shutdown Analysis, Fire Hazards Analysis Report, USAR, drawings, Operations Manual, and other PINGP source documents were used to identify SSCs which perform fire protection functions and which support fire protection equipment relied upon to achieve post-fire safe shutdown. A list of equipment was compiled from this review and was used to compare to equipment designated as fire protection or Appendix R related in the plant equipment database. Components and commodities included on the SSEL are in-scope for License Renewal.

2) Environmental Qualification (EQ)

The criteria for determining which equipment requires environmental qualification is defined by 10 CFR Part 50.49. Electric equipment covered in 10 CFR Part 50.49 is characterized as follows:

a) Safety related electric equipment that is relied upon to remain functional during and following design basis events to ensure:

(i) The integrity of the reactor coolant 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 that could result in potential offsite exposures comparable to the guidelines in §50.34(a)(1), §50.67(b)(2), or §100.11 of Title 10 CFR.

Design Basis Events are defined as conditions of normal operation, including anticipated operational occurrences, design basis accidents, external events, and natural phenomena for which the plant must be designed to ensure functions (i) through (iii) of this paragraph.

b) Non-safety related electric equipment whose failure under postulated environmental conditions could prevent satisfactory accomplishment of the previously specified safety functions by safety related equipment.

c) Certain post-accident monitoring equipment (Refer to Regulatory Guide 1.97, Revision 3, “Instrumentation for Light Water Cooled Nuclear Power Plants to Assess Plant and Environs During and Following an Accident”).

Electrical components, which meet these criteria for PINGP, are on the Environmental Qualification Master List (EQML) for 10 CFR 50.49. The EQML was developed to encompass the requirements identified in 10 CFR 50.49(b). Safety related electrical equipment, non-safety related electrical equipment whose failure could prevent accomplishment of safety functions, and certain post-accident monitoring equipment were identified.

The EQ Master List is the current component list of EQ components and is used as the basis for License Renewal identification of EQ components for purposes of scoping and screening, which is consistent with NUREG-1800.

Environmental qualification basis information is included in the PINGP USAR, Section 8.9.

Consistent with the requirements specified in 10 CFR 54.4(a)(3), all SSCs relied upon to perform a function that demonstrates compliance with the regulation 10 CFR 50.49, EQ, are within the scope of License Renewal.

3) Pressurized Thermal Shock (PTS)

A Pressurized Thermal Shock (PTS) Event is an event or transient in pressurized water reactors causing severe overcooling (thermal shock) concurrent with or followed by significant pressure in the reactor vessel. A PTS concern arises if one of these transients acts on the beltline region of a reactor vessel where a reduced fracture resistance exists due to neutron irradiation. Per the requirements of 10 CFR 50.61 (PTS Rule), licensees of pressurized water reactors shall have projected values of RT_{PTS}, accepted by the NRC, for each reactor vessel beltline material for the end of life (EOL) fluence of the material. The assessment of RT_{PTS} must use the calculation procedures and screening criteria given in the PTS Rule, and must specify the basis for the projected value of RT_{PTS} for each vessel beltline material. The assessment must be updated whenever there is a significant change in projected values of RT_{PTS} or upon the request for a change in the expiration date for operation of the facility.

From a scoping standpoint, the Units 1 and 2 Reactor Vessels are considered to be within the scope of 10 CFR 54.4(a)(3) for PTS. Furthermore, the radiation embrittlement of reactor vessel beltline materials is an aging mechanism that was further evaluated as a TLAA in Section 4.2.3.

4) Anticipated Transients Without Scram (ATWS)

The NRC, by its issuance of the Anticipated Transients Without Scram (ATWS) Rule (10 CFR 50.62), required plants to install or modify systems used to support mitigation of an ATWS event. As defined in 10 CFR Part 50.62, an ATWS is an expected operational transient (such as loss of feedwater, loss of load, or loss of offsite power) which is accompanied by a failure of the reactor protection system to shutdown the reactor.

The final ATWS rule, 10 CFR Part 50.62, “Requirements for Reduction of Risk from Anticipated Transients Without Scram (ATWS) Events for Light-Water-Cooled-Nuclear Power Plants,” was published by the NRC on July 26, 1984. For Westinghouse plants, this rule required the installation of an ATWS Mitigating System Actuation Circuitry (AMSAC) system to initiate a turbine trip and actuate auxiliary feedwater flow independent of the reactor protection system.

In December 1996, PINGP reviewed the design basis for the Auxiliary Feedwater System and determined that the existing pump low discharge pressure setpoint did not adequately protect the auxiliary feedwater pumps (AFWP) from runout conditions. PINGP determined that the preferred method for correction of this issue was the installation of a diverse scram system similar to that described in 10 CFR Part 50.62 for Combustion Engineering and Babcock & Wilcox plants. The ATWS Mitigating System Actuation Circuitry/Diverse Scram System (AMSAC/DSS) is described in USAR Section 7.11. ATWS Event analysis can be found in USAR Section 14.8.

As described in USAR Section 7.11.6, “A reactor trip, a turbine trip and auxiliary feedwater pump start are required AMSAC/DSS functions, with securing of steam generator blowdown and sampling as recommended outputs.”

Plant and vendor drawings, the USAR, docketed correspondence, modifications, and the plant equipment database were reviewed to identify components relied upon to mitigate the ATWS event. These components are in-scope for License Renewal.

5) Station Blackout (SBO)

On July 21, 1998, the Nuclear Regulatory Commission amended its regulations in 10 CFR Part 50 by adding a new section, 50.63, Loss of All Alternating Current Power (the SBO rule). The objective of this requirement was to assure that all nuclear power plants are capable of withstanding a Station Blackout, maintaining adequate reactor core cooling, and maintaining appropriate containment integrity for a required duration. The staff issued Regulatory Guide 1.155, Station Blackout, to provide guidance for meeting the requirements of 10 CFR 50.63. Concurrent with the development of this regulatory guide, the Nuclear Utility Management and Resource Council (NUMARC) developed a document titled, Guidelines and Technical Basis for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors, NUMARC 87-00. These documents provide detailed guidelines and procedures on how to assess each plant's capabilities to comply with the SBO rule. The NRC staff concluded that the NUMARC document provided acceptable guidance for addressing the 10 CFR 50.63 requirements.

At PINGP, the SBO rule is implemented by methods described in NUMARC 87-00 and Regulatory Guide 1.155. SBO rule implementation details for PINGP are established in docketed correspondence, SERs, and supporting calculations. USAR Section 8.4 and Section 8.5 include summaries of the licensing criteria that are the CLB for resolution of this issue at PINGP.

In its original configuration, with two emergency diesel generators (EDGs) shared between the two Units, PINGP was classified as an 8 hour coping period facility. In order to reduce the coping period to 4 hours or less, PINGP modified the 4.16kV Auxiliary System to provide two dedicated EDGs per Unit. Each EDG is capable of supplying the required SBO loads on the affected Unit and the loss of off-site power safe shutdown loads on the non-SBO Unit. Other performance requirements were also established to achieve the 4 hour coping category, such as offsite grid and EDG reliability criteria. The new design was able to demonstrate that alternate AC power would be available to the SBO Unit within the first 10 minutes of the event.

In support of License Renewal scoping determinations for Station Blackout, the NRC issued additional information in Interim Staff Guidance LR-ISG-02 (Reference 10). That guidance recommended the plant-specific portion of the offsite power system, not normally part of the SBO Rule, be included within the scope of License Renewal. That guidance was subsequently added to the scoping section of NUREG-1800 and has been considered in the identification of PINGP SSCs in-scope for License Renewal.

In order to ensure a comprehensive list of SSCs required to satisfy 10 CFR 54.4(a)(3) for SBO was developed, the requirements and guidance associated with SBO implementation were reviewed to identify PINGP specific functional requirements and reliance on SSCs for 10 CFR 50.63 compliance. Components relied upon at PINGP to perform an SBO function were identified through a review of plant-specific SBO calculations, the USAR, drawings, modifications, and the plant equipment database. This review was supplemented with the additional NRC guidance on License Renewal SBO SSC scoping relative to offsite power restoration contained in NUREG-1800, Revision 1.

A review of one-line drawings and plant procedures for performing offsite power restoration was performed. Components explicitly relied upon in offsite power restoration procedures and their interconnections (busses, disconnect switches, etc.) are in-scope for License Renewal. Components and commodities in-scope for License Renewal are those from the plant 4.16kV busses, through and including the interconnecting transformers, disconnect switches, busses, etc. out to and including the switchyard devices that connect to offsite sources.

2.1.2.5 Mechanical Scoping Methodology

2.1.2.5.1 Discipline Specific Scoping Process

The mechanical discipline was responsible for scoping evaluations for plant mechanical systems, including electrical and structural components contained in these systems (unless reassigned to another discipline). License Renewal system boundaries were initially based on the associated plant equipment database system designators. These boundaries were then modified as needed through a system and component function review that used the USAR, P&IDs, DBDs, other drawings, docketed correspondence, and other design documents. Results were captured in the License Renewal database and depicted on the License Renewal Boundary Drawings for the mechanical components. The mechanical systems identified for License Renewal and the associated scoping results are listed in Table 2.2-1.

2.1.2.5.2 Systems/Asset Groups/Components

Components in the plant equipment database were input to the License Renewal database. Additional components were added to the License Renewal database when necessary. In some cases, asset groups were used where it was deemed efficient to process a single component type as one asset within a system rather than many individual components having the same construction and function.

The components and asset groups were created within the License Renewal database to ensure that all necessary assets/components would be accurately described and addressed within the License Renewal process. The following are examples of decisions made in the mechanical area:

- Piping components (i.e., unique tag numbers/line numbers) were grouped within representative piping asset groups to identify the in-scope piping. The piping was uniquely identified as in or out of scope on the License Renewal Boundary Drawings. Piping material data from the plant equipment database was used to determine the material groupings.
- Instrument Manifolds are not identified in the plant equipment database or on the P&IDs. Therefore, these were added to the associated system as an asset group.
- Fasteners are not identified in the plant equipment database or on the License Renewal Boundary Drawings. Therefore, these were added to the associated system as an asset group.
- Tubing for instrument sensing lines is not identified in the plant equipment database or on the License Renewal Boundary Drawings. Therefore, this tubing was added to the associated system as an asset group.
- Thermowells for Temperature Elements are not identified in the plant equipment database. Therefore, these were added to the associated system as an asset group to identify the pressure boundary function of either Temperature Element thermowells or other fittings (for direct immersion temperature elements).

2.1.2.5.3 Evaluation Boundaries

For mechanical systems, the evaluation boundaries were defined by tracing the flow paths needed to perform the system's intended functions.

Components within these boundaries are considered to be within the scope of License Renewal.

The License Renewal Boundary Drawings were reviewed to ensure in-scope components shown were identified in the License Renewal database.

EIC components which also have a mechanical intended function (i.e., pressure transmitters providing a pressure boundary intended function) were assigned to a Mechanical System for scoping and screening. All other EIC components were assigned to an EIC commodity.

2.1.2.5.4 System Level Functions

The License Renewal database, using the CLB resources discussed in Section 2.1.1.1, was used to assign system level functions.

When components were reassigned to different License Renewal systems as part of the system consolidation effort described in Section 2.1.2.2, the system function associated with those components was also moved to the new system, and the original component function deleted (if no other components performed that function) from the original system.

2.1.2.5.5 Special Considerations

Special treatment was necessary in the scoping of some types of components.

- Staged SSCs that are dedicated (reserved) for use in an application that, when installed, are relied upon to perform an intended function as identified in 10 CFR 54.4(a), were included in the scope of License Renewal. The components involved are relied on in safety analyses, plant evaluations, or license conditions, kept in storage and dedicated for a specific application, and available for immediate usage. Tools and supplies used to place staged equipment in service, and that are not required for the installed equipment to remain operable (once placed in service), are outside the scope of License Renewal (i.e. tools and supplies do not meet the License Renewal scoping criteria of 10 CFR 54.4(a)).
- Thermal insulation that performs an intended function as identified in 10 CFR 54.4(a) was included in the scope of License Renewal. The components involved are relied on in safety analyses, plant evaluations, or license conditions and meet the License Renewal scoping criteria of 10 CFR 54.4(a)(1) or (a)(3). Insulation installed for thermal efficiency, personnel protection or credited with maintaining SCs temperatures during normal operation is not within the scope of License Renewal.

- Abandoned equipment that is removed from the plant or disconnected and drained does not have a potential for spatial interaction (i.e. no fluids contained in the SSC), and is not within the scope of License Renewal. Abandoned equipment that is installed and connected to plant process pipes needs to be evaluated for non-safety attached to safety and non-safety affecting safety spatial interaction scoping criteria.

  Industry and site specific operating experience reviews have shown no failures due to aging of non-safety related SSCs containing air/gas have adversely impacted the satisfactory accomplishment of an intended function. Therefore abandoned in place equipment with an air/gas internal environment are not in scope for 10 CFR 54.4(a)(2). However, collapse of abandoned in place equipment onto safety related SSC could adversely impact the satisfactory accomplishment of an intended function. To address this concern, non-safety related component supports in structures that house 10 CFR 54.4(a)(1) SSCs are included within the scope of License Renewal for 10 CFR 54.4(a)(2).

2.1.2.6 Civil/Structural Scoping Methodology

2.1.2.6.1 Discipline Specific Scoping Process

The civil/structural discipline was responsible for the scoping evaluations for structures and structural commodity groups. The License Renewal civil/structural boundaries were initially based on the associated plant equipment database system designators and on the USAR classification. Since very few structural elements are included in the plant equipment database, the PINGP Structures Monitoring Program, USAR, DBDs, drawings, procedures, and walkdowns were used to develop a comprehensive list of structures and commodity groups for License Renewal.

The civil/structural structures and commodity groups identified for License Renewal and the associated scoping results are listed in Table 2.2-1.

2.1.2.6.2 Structures/Commodity Groups

Structures include site facilities such as the Auxiliary Building, Reactor Containment Vessels, and SBO Yard Structures, while commodity groups include Component Supports, Cranes, Heavy Loads, Fuel Handling and Fire Protection Barriers. Commodity groups were created in order to disposition the entire group of like components with a single AMR. They are constructed of similar materials and are similar in design and aging management practices regardless of the specific PINGP structure to which they reside.

New components identified by material and structure (e.g., Concrete - Screenhouse) were created within the License Renewal database to ensure that all necessary structural components would be accurately described and addressed within the License Renewal process.

The scoping process for structures and commodity groups includes a review of plant documents and practices listed above to determine if the structure or component performed any of the functions identified in 10 CFR 54.4. Those that performed one or more functions were determined to be within the scope of License Renewal.

The Component Supports commodity group includes supporting members, connections, anchorage, etc. for plant mechanical and electrical equipment and also includes certain equipment such as cable tray, conduit, panels, thermal insulation, and equipment housings among others. Component Supports do not include components used to support miscellaneous structures such as platforms, stairs, ladders, jet impingement shields, pipe whip restraints, masonry walls and others. These miscellaneous structures are evaluated with the structure where they reside.

The Fire Protection Barriers commodity group includes fire barrier penetration seals and fire proofing of various materials, fire doors, and various steel and stainless steel components used in fire barrier assemblies among others. Fire Protection Barriers do not include concrete walls and slabs that perform a fire barrier function. These concrete walls and slabs are evaluated with the structure where they reside.

The Cranes, Heavy Loads, Fuel Handling commodity group includes heavy load handling components where the potential for a heavy load drop could result in damage to safety related equipment (i.e. subject to the requirements of NUREG-0612), and light load handling components associated with refueling activities. Structural components include crane rails, structural girders, beams, special lifting devices, and welded and bolted connections among others.

Table 2.2-1 lists all civil/structural structures and commodity groups evaluated for License Renewal. The list identifies structures both in scope and not in scope of License Renewal. Structures not in scope of License Renewal are grouped under, "Miscellaneous Non-Safety Related Structures" and "Water Control Structures, Non-Safety Related."

2.1.2.6.3 Evaluation Boundaries

The civil/structural evaluation boundaries were defined by review of the USAR, plant site layout drawings, by plant walkdowns and by review of the location of in-scope mechanical and electrical systems and components needed to perform the system's intended functions.

Building evaluation boundaries were established at the building column lines and/or physical barriers. Where flexibility was applied in determining the location of a boundary between adjacent structures, this was explained in detail in the structure description.

A civil/structural License Renewal Boundary Drawing was prepared to document the structures and components determined to be in-scope of License Renewal.

2.1.2.6.4 System Level Functions

System level functions and associated 10 CFR Part 54 criteria applicable to the structure were identified during scoping. Information sources included the USAR, CLB documentation, DBDs, training materials, plant equipment database, drawings, specifications, codes/standards, design changes, procedures, and walkdowns of plant buildings.

Criterion 1 structures are identified in Section 12 of the USAR.

For Criterion 2, Non-Safety Related Affecting Safety Related, additional reviews were performed to identify:

- Structures credited as HELB barriers (pipe whip, jet impingement),
- Structures credited for internal and external flooding,
- Load handling equipment credited for NUREG-0612 or fuel handling,
- Structures credited as internal or external missile barriers,
- Structures identified in the CLB whose failure during a seismic event (seismic interactions) could adversely affect safety related equipment or structures,
- Equivalent anchor supports, and
- Structures (e.g., pipe supports) whose failure could adversely affect SSCs performing a Criterion 1 function (based on criteria described in Section 2.1.2.4.2).

Structures and components that perform functions necessary to demonstrate compliance with 10 CFR 50.48, 50.49, 50.61, 50.62 and/or 50.63 are in scope for License Renewal under Criterion 3. These include structures and components that perform these functions directly (e.g., serve as fire barriers) as well as those that support equipment essential to the performance of such functions.

2.1.2.7 Electrical / I&C Scoping Methodology

2.1.2.7.1 Discipline Specific Scoping Process

The electrical discipline was responsible for performing evaluations of the plant EIC systems to determine if they fell within the scope of License Renewal.

The EIC components without a mechanical intended function, that are associated with EIC or mechanical systems, were classified and processed as commodity groups. Commodity groups were utilized because the component evaluations were best performed by component type, rather than by system or structure. Commodity groups were formed from components that were constructed from similar materials, exposed to similar environments, or performed similar intended functions regardless of the specific system or structure to which they were originally assigned. Since components from the EIC systems were addressed in the commodity groups, no system level functions were identified or considered for the IPA. Therefore, no EIC systems were eliminated from scope.

Information regarding the EIC commodities was identified from review of the USAR, plant equipment database, CLB documentation, DBDs, databases and documents, procedures, drawings, specifications, codes/standards, and system walkdowns.

The EIC components belonging to EIC commodities were classified and processed as commodities utilizing the In-Scope Bounding Approach (Plant Spaces Approach). The commodity classifications were based on NEI 95-10 Appendix B as a guideline. The general approach taken was to assume that EIC commodities are in scope for criteria 10 CFR 54.4(a)(1), (2) and (3).

EIC components in the mechanical systems that were of a component type that had a mechanical intended function, such as pressure boundary, were processed with the mechanical system and not processed with the EIC commodity. The other EIC components belonging to mechanical systems were classified and processed as EIC commodities (rather than with the mechanical system).

Component level intended functions of the EIC commodity groups were identified. Since components from the EIC systems were addressed in the commodity groups, no system level intended functions were identified or considered for the IPA.

Those EIC commodities, which supported intended functions, were considered within the scope of License Renewal. Specific EIC components belonging to “in-scope” commodities were excluded on a case-by-case basis during the AMR process, when it was determined that these cables and components did not satisfy any scoping criteria.

EIC components that were processed by the electrical discipline were transferred from the PINGP system assignments to EIC commodity groups.

The EIC systems identified for License Renewal and the associated scoping results are listed in Table 2.2-1.

2.1.3 Screening Process Methodology

2.1.3.1 License Renewal Screening Rule

NUREG-1800 uses the term “screening” when referring to the application of §54.21 (a)(1)(i) and (ii) criteria (NUREG-1800 Section 2.1.1.2). These criteria are provided in part as follows:

1) For those systems, structures, and components within the scope of this part, as delineated in 10 CFR 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 10 CFR 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.

2.1.3.2 General Screening Methodology

2.1.3.2.1 Screening Process Overview

The screening process identifies the structures and components within the scope of License Renewal that are subject to an Aging Management Review. These structures and components are those that perform or support an intended function in support of the Systems, Structures or Commodity Group function(s) without moving parts or without a change in configuration or properties (referred to as passive) and are not subject to replacement based on qualified life or specified time period (referred to as long-lived).

A component level intended function is one that supports the system level intended function; the plant systems, structures, and commodity groups that are within the scope of License Renewal and their system level intended functions were previously identified during the scoping process.

The screening process consists of the following distinctive steps:

1. Identification of the components that are subject to an AMR (passive and long-lived) within the scope of License Renewal.
2. Identification of the component level intended functions for equipment subject to an AMR.

2.1.3.2.2 Component Classification (Passive, Long Lived)

As part of the screening process, structures and components that were within the License Renewal evaluation boundaries were identified as being passive or active and either long lived or short lived. Active structures and components are those with moving parts, or change in configuration or properties, while short lived structures and components have an established service life, qualified life or replacement frequency controlled by plant procedures. Active and/or short lived structures and components do not require an AMR, and were not evaluated further via the IPA process. For a description of passive and long lived structures and components, see Section 2.1.3.2.1. Appendix B to NEI 95-10 was used as guidance for the passive/active determinations.

Consumables are a special class of components that can include packing, gaskets, component seals, O-rings, structural sealants, oil, grease, component filters, system filters, fire extinguishers, fire hoses, and air packs.

a. Packing, Gaskets, Component Seals and O-Rings

Packing, gaskets, component seals and O-rings are commonly found in components such as valves, pumps, heat exchangers, piping, dampers and ducts. Based on B31.1.0 and the ASME B&PV Code Section III, these subcomponents are not pressure-retaining parts. Therefore, these subcomponents are not relied on to perform a pressure-retaining function or other intended function and are not subject to an AMR.

b. Structural Sealants

Structural sealants may perform functions without moving parts, or a change in configuration or properties, and they are not typically replaced. Those determined to perform component intended functions in support of a larger structure were subject to an AMR.

c. Oil, Grease and Component Filters

Oil, grease and component filters are commonly found in components such as pumps, valves, diesel motors, fans and dampers. These components are short-lived and are periodically replaced in accordance with procedures. Therefore, these components are not subject to an AMR.

d. System Filters, Fire Extinguishers, Fire Hoses and Air Packs

System filters, fire hoses, fire extinguishers, and air packs, are short-lived 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 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. Criteria for inspection and replacement are based on accepted industry standards (e.g., Branch Technical Position BTP-APCSB 9.5-1 (Reference 11), NFPA-10 (Reference 12) for fire extinguishers, NFPA-1962 (Reference 13) for fire hoses, and 29 CFR 1910.134 (Reference 14) for air packs). Therefore, these components are not subject to an AMR. However, system filters or strainers that are not periodically replaced are subject to an AMR.

A component (or commodity group) that was determined to be active or short lived was not subject to an AMR, and was screened out by the process.

2.1.3.2.3 Component Level Functions

A component level intended function is one that is required for the system or structure to perform its system level intended function(s). A component must have at least one component level intended function, in order for the component to be subject to AMR. Components may have more than one intended function.

Component level intended functions were assigned to components subject to AMR. Table 2.1-1 lists PINGP-specific component level intended functions.

The scoping and screening reports list component level License Renewal intended functions associated with each in-scope structure or component.

2.1.3.2.4 Components Subject to Aging Management Review

The components (or commodity groups) that are subject to an AMR are those that perform a component level intended function without moving parts or a change in configuration or properties and are not subject to replacement based on a qualified life or specified frequency.

The scoping and screening reports identify all structures and components subject to an AMR. These reports are prepared for each system, structure, or commodity group within the scope of License Renewal. These reports include:

- List of components within the system, structure, or commodity group
- List of components within the License Renewal evaluation boundary
- Component level intended functions
- Active/passive determinations
- Periodic replacement determination
- Determination that component is or is not subject to AMR
- Comments

2.1.3.3 Mechanical Screening Methodology

2.1.3.3.1 Screening of Mechanical Components

Special Treatment was necessary in the screening of some types of components.

- Thermowells for temperature elements were not identified in the plant equipment database. Therefore, these were added as an asset group to the required systems to identify the pressure boundary function of either the temperature element thermowell or other fitting (for direct immersion temperature elements).
- Solenoid operated valves are typically active components. However, in some cases, the solenoid valve body will perform a pressure boundary function. Solenoid operated valves serving a pressure boundary function were designated passive.
- Screening of staged components requires special consideration. For example, the active structures and components excluded by 10 CFR 54.21(a)(1)(i) from AMR presumes that the SCs are installed in the plant and are challenged by routine operation or periodic testing. This logic may not apply to active components (motors, switchgear, etc.) kept in storage if they are not challenged by routine operation or periodic testing.

2.1.3.3.2 Mechanical Component Level Functions

When assigning component level License Renewal intended functions, some components had more than one intended function. For example, a heat exchanger could have both a pressure boundary and a heat transfer intended function. The heat transfer function has an aging effect of heat transfer degradation due to fouling that is evaluated separately from aging effects related to pressure boundary integrity.

2.1.3.4 Civil / Structural Screening Methodology

2.1.3.4.1 Screening of Structural Components

During performance of component screening and the License Renewal database information input, several guidelines were used to establish evaluation boundaries. Specific boundary positions and interpretations, refined during the screening process, included:

- In order for a component to be considered within the boundary for a particular structure, the component needed to fulfill at least one of the three 10 CFR 54.4(a) scoping criterion. The term License Renewal Boundary is not synonymous with the physical boundary. For example, a masonry wall that did not meet any of the three criteria would not be in the License Renewal Boundary.

- For the generic components that were created, more than one Criterion could be assigned.
- Doors were included with the structure in which they are located. Fire doors were evaluated in the Fire Protection Barrier commodity group.

2.1.3.4.2 Civil Component Level Functions

A component level intended function could be an inherent attribute of the component's design. Examples include:

1. A Class I structure has walls that are capable of withstanding externally generated missiles, i.e., protection against tornado generated objects.
2. A HELB or Flood barrier can also have a shelter protection function for safety related equipment in its vicinity.

2.1.3.5 Electrical / I&C Screening Methodology

2.1.3.5.1 Screening of Electrical Components

Based on the complexity of identifying whether or not an individual insulated cable or connection supports an intended function, PINGP elected to include, as a commodity, insulated cable and connections within the scope of License Renewal. When individual cables and connections were identified during the AMR process as EQ, or as not providing an intended function, no further AMR was required.

The screening process completed the asset identification process, verified the identification of component types, and evaluated each of the component types against the screening criteria. The screening process evaluation also identified the component level intended functions that were assigned to component types in accordance with NEI 95-10 and NUREG-1801.

Following development of a list of electrical commodity groups, those commodity groups classified as active (from NEI 95-10 Appendix B) were screened out and removed from further consideration. The remaining components were organized into AMR commodity groups for AMR.

The resulting AMR electrical commodity groups of long-lived passive components subject to an AMR are:

- Cables and Connections (Insulation), includes splices, terminations, fuse blocks and connectors
- Cables and Connections Used in Instrumentation Circuits (Insulation), sensitive to reduction in conductor insulation resistance
- Inaccessible Medium Voltage Cables and Connections (Insulation), underground, buried
- Electrical Connector Contacts (metallic connector pins exposed to borated water)
- Electrical Penetrations (electrical insulation portions)
- Metal Enclosed Bus and Connections (Bus/Connections, Enclosure Assemblies, Insulation/Insulators)
- Fuse Holders (metallic parts), not part of a larger active assembly
- Cable Connections (metallic parts)
- Switchyard Bus and Connections
- Transmission Conductors and Connections
- High-Voltage Insulators

One additional commodity, Uninsulated Ground Conductors and Connections, was also identified as being subject to AMR. Further evaluation, however, indicated that cables and connections with grounding and lightning protection functions are installed to provide personnel safety and to limit the economic impact from fault and lightning occurrences on plant equipment and buildings. Grounding and lightning protection functions do not have specific regulatory bases, but are designed to standard industry practices. Therefore cables and connections providing grounding and lightning protection functions do not support an intended function, and were excluded from further consideration in the LRA.

2.1.3.5.2 **Electrical Component Level Functions**

To electrically support any specific system or component License Renewal intended function, the electrical cables' and connections' role is limited to maintaining these two main electrical License Renewal functions:

- Electrical Continuity
- Insulate (Electrical)

Other intended functions on some electrical commodity groups are addressed and managed under their respective structural group:

- Expansion/Separation, structural (for elastomer metal enclosed bus housing seals)
- Shelter Protection, structural (for steel metal enclosed bus housings)
- Structural Support, structural (metallic portion of high voltage insulators)

Section 2.1 References

1. NEI 95-10, Industry Guideline for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule, Revision 6, June 2005
2. Nuclear Management Company Quality Assurance Topical Report, NMC-1, Revision 4, November 20, 2007
3. NUREG-1800, Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants, Revision 1, September 2005
4. NUREG-1801, Generic Aging Lessons Learned (GALL) Report, Revision 1, September 2005
5. Regulatory Guide 1.188, Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses, Revision 1, September 2005
6. NUREG-0933, A Prioritization of Generic Safety Issues, Supplement 31, September 2007
7. Regulatory Guide 1.54, Service Level I, II and III Protective Coatings Applied to Nuclear Plants, Revision 1
8. Generic Letter 2004-02, Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors, September 13, 2004
9. Generic Letter 98-04, Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System after a Loss-of-Coolant Accident because of Construction and Protective Coating Deficiencies and Foreign Material in Containment, July 14, 1998
10. NRC Interim Staff Guidance 02, NRC Staff Position on the License Renewal Rule (10 CFR 54.4) as it relates to The Station Blackout Rule (10 CFR 50.63), attached to NRC Letter from D. Matthews to A. Nelson, Nuclear Energy Institute, and D. Lochbaum, Union of Concerned Scientists, dated April 1, 2002
11. Branch Technical Position BTP-APCSB 9.5-1, Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976
12. NFPA-10, Standard for Portable Fire Extinguishers, 2007
13. NFPA-1962, Standard for Inspection, Cure, and Use of Fire Hose, Couplings, and Nozzles and the Service Testing of Fire Hose, 2003
14. 29 CFR 1910.134, OSHA's Respiratory Protection Standard, April 1998

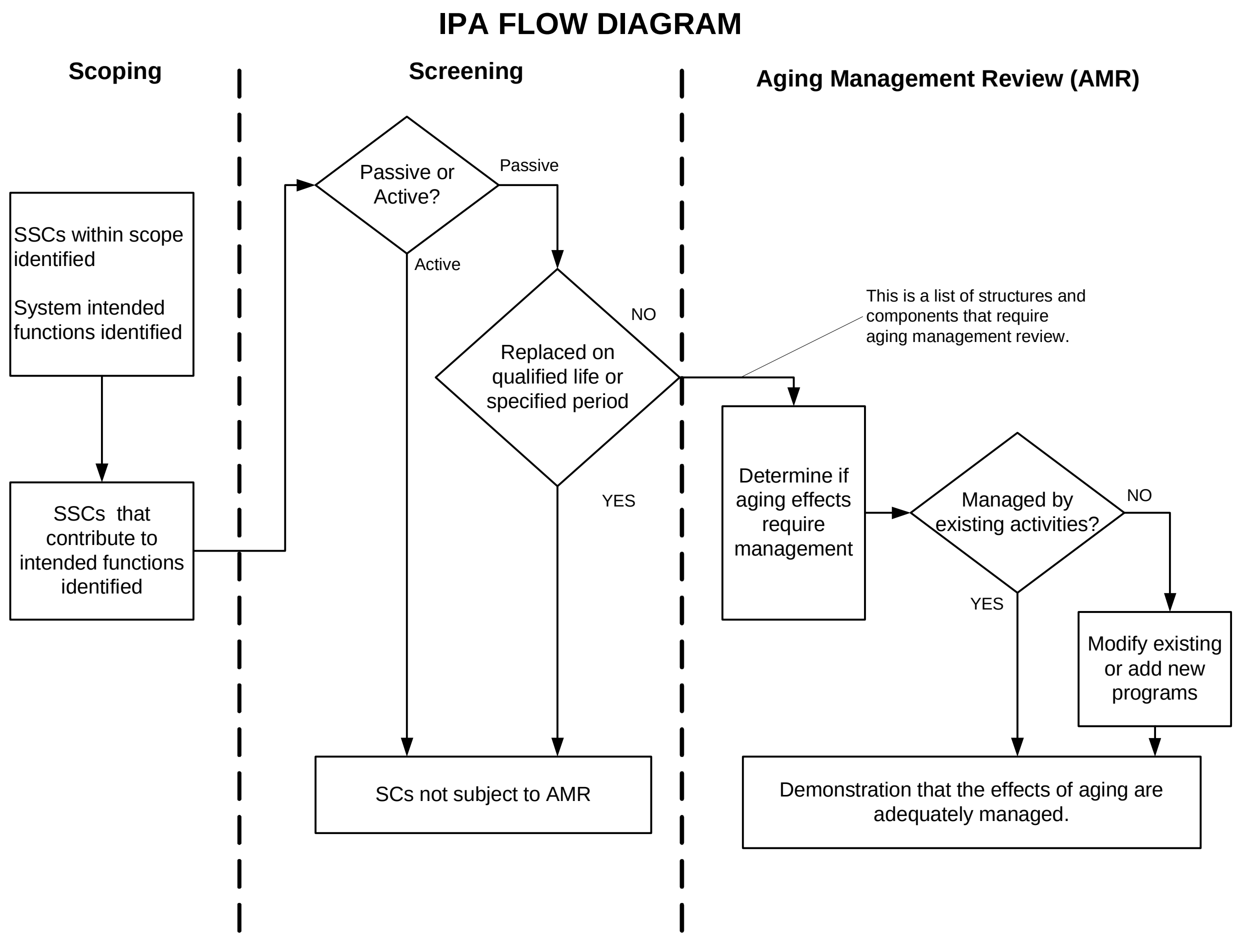
Table 2.1-1 Component Intended Function Abbreviations and Definitions

Intended Function	Definition
Direct Flow	Provide spray shield or curbs for directing flow (e.g., safety injection flow to containment sump)
Electrical Continuity	Provide electrical connections to specified sections of an electrical circuit to deliver voltage, current or signals
Expansion/Separation	Provide for thermal expansion and/or seismic separation
Filter	Provide filtration
Fire Barrier	Provide rated fire barrier to confine or retard a fire from spreading to or from adjacent areas of the plant
Flood Barrier	Provide flood protection barrier (internal and external flooding event)
Gaseous Release Path	Provide path for release of filtered and unfiltered gaseous discharge
Heat Transfer	Provide heat transfer
HELB Shielding	Provide shielding against high energy line breaks
Insulate (electrical)	Insulate and support an electrical conductor
Missile Barrier	Provide missile barrier (internally or externally generated)
Pipe Whip Restraint	Provide pipe whip restraint
Pressure Boundary	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. This function includes maintaining mechanical and structural integrity, fluid and pressure retention, flow path, structural support, and physical integrity considerations.
Pressure Relief	Provide over-pressure protection
Shelter Protection	Provide shelter/protection to safety related and/or non-safety related components
Shielding	Provide shielding against radiation
Shutdown Cooling Water	Provide source of cooling water for plant shutdown
Spray	Convert fluid into spray

Table 2.1-1 Component Intended Function Abbreviations and Definitions

Intended Function	**Definition**
Structural Pressure Barrier	Provide pressure boundary or essentially leak tight barrier to protect public health and safety in the event of any postulated design basis events
Structural Support	Provide structural and/or functional support to safety related and/or non-safety related components
Thermal Insulation	Provide resistance to heat transfer
Throttle	Provide flow restriction

Figure 2.1-1 Simplified IPA Flow Diagram



2.2 Plant Level Scoping Results

The systems, structures, and components at PINGP were evaluated as to whether they were within the scope of License Renewal, using the methodology described in Section 2.1. The results are shown in Table 2.2-1.

Table 2.2-1 Plant Level Scoping Results

Description	Within Scope of License Renewal?	LRA Section
SRP Evaluation Group: Reactor Vessel, Internals, and Reactor Coolant System		
Pressurizer (PS) System	Yes	Section 2.3.1.1
Reactor Coolant (RC) System	Yes	Section 2.3.1.2
Reactor Internals (RX) System	Yes	Section 2.3.1.3
Reactor Vessel (RV) System	Yes	Section 2.3.1.4
Steam Generator (SG) System	Yes	Section 2.3.1.5
SRP Evaluation Group: Engineered Safety Features		
Containment Spray (CS) System	Yes	Section 2.3.2.1
Residual Heat Removal (RH) System	Yes	Section 2.3.2.2
Safety Injection (SI) System	Yes	Section 2.3.2.3
SRP Evaluation Group: Auxiliary Systems		
Auxiliary and Radwaste Area Ventilation (ZA) System	Yes	Section 2.3.3.1
Chemical and Volume Control (VC) System	Yes	Section 2.3.3.2
Component Cooling (CC) System	Yes	Section 2.3.3.3
Containment Hydrogen Control (HC) System	Yes	Section 2.3.3.4
Control Room and Miscellaneous Area Ventilation (ZN) System	Yes	Section 2.3.3.5
Cooling Water (CL) System	Yes	Section 2.3.3.6
Diesel Generator and Screenhouse Ventilation (ZG) System	Yes	Section 2.3.3.7
Diesel Generators and Support (DG) System	Yes	Section 2.3.3.8
Fire Protection (FP) System	Yes	Section 2.3.3.9
Fuel Oil (FO) System	Yes	Section 2.3.3.10
Guardhouse Ventilation (GH) System	No	N/A
Heating (HS) System	Yes	Section 2.3.3.11
Miscellaneous Gas (CG) System	Yes	Section 2.3.3.12
Plant Sample (SM) System	Yes	Section 2.3.3.13
Primary Containment Ventilation (ZC) System	Yes	Section 2.3.3.14
Radiation Monitoring (RD) System	Yes	Section 2.3.3.15
Spent Fuel Pool Cooling (SF) System	Yes	Section 2.3.3.16
Station and Instrument Air (SA) System	Yes	Section 2.3.3.17
Steam Exclusion (SE) System	Yes	Section 2.3.3.18
Turbine and Administration Building Ventilation (ZB) System	Yes	Section 2.3.3.19
Waste Disposal (WD) System	Yes	Section 2.3.3.20
Water Treatment (DE) System	Yes	Section 2.3.3.21

Table 2.2-1 Plant Level Scoping Results

Description	Within Scope of License Renewal?	LRA Section
SRP Evaluation Group: Steam and Power Conversion System		
Auxiliary Feedwater (AF) System	Yes	Section 2.3.4.1
Bleed Steam (BL) System	Yes	Section 2.3.4.2
Circulating Water (CW) System	Yes	Section 2.3.4.3
Condensate (CD) System	Yes	Section 2.3.4.4
Feedwater (FW) System	Yes	Section 2.3.4.5
Main Steam (MS) System	Yes	Section 2.3.4.6
Steam Generator Blowdown (SB) System	Yes	Section 2.3.4.7
Turbine Generator and Support (TB) System	Yes	Section 2.3.4.8
SRP Evaluation Group: Containments, Structures and Component Supports		
Auxiliary and Turbine Buildings	Yes	Section 2.4.1
Component Supports	Yes	Section 2.4.2
Cranes, Heavy Loads, Fuel Handling	Yes	Section 2.4.3
D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building	Yes	Section 2.4.4
Fire Protection Barriers	Yes	Section 2.4.5
Radwaste Building, Old Administration Building, and Administration Building Addition	Yes	Section 2.4.6
Reactor Containment Vessels Units 1 and 2	Yes	Section 2.4.7
SBO Yard Structures	Yes	Section 2.4.8
Shield Buildings Units 1 and 2	Yes	Section 2.4.9
Tank Foundations	Yes	Section 2.4.10
Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse	Yes	Section 2.4.11

Table 2.2-1 Plant Level Scoping Results

Description	Within Scope of License Renewal?	LRA Section
Miscellaneous Non-Safety Related Structures, including: 1. New Administration Building 2. Transmission Towers and Foundations (not part of SBO recovery paths) 3. Unit 2 Transformer (2GT) and support structure 4. Unit 2 Transformer (2M) and support structure 5. Chlorine House 6. Light mast in protected area 7. Miscellaneous storage/shops/warehouse/office/training building 8. Transformer Oil Sumps 9. Unit 1 Transformer (M) and support structure 10. Unit 1 Transformer (GT) and support structure 11. Security Building 12. Security Diesel Generator Building 13. Cold Hazardous Waste Building and Hydrogen Gas Storage Area 14. Gashouse 15. Nitrogen Tanks 16. Brine Tank Room 17. Truck Loading Enclosure 18. Equipment Hatch Platform 19. Waste Neutralizing Tank House 20. Low Level Radwaste Storage Building 21. Resin Disposal Building 22. Maintenance Storage Shed 23. D3/D4 Diesel Generator Building 24. Decontamination Building 25. Environmental Lab 26. Screen Storage Building 27. Rad Monitor Building 28. Communication Tower 29. Met Tower 30. Meteorological Facility (no longer in use) 31. Deep Well Pumphouse #2 32. Deep Well Pumphouse #1 33. Parking Lot 34. OCA Gatehouse 35. Independent Spent Fuel Storage Installation (ISFSI) 36. Tornado Shelters 37. Electric and Distribution Panel	No	N/A

Table 2.2-1 Plant Level Scoping Results

Description	Within Scope of License Renewal?	LRA Section
Water Control Structures, Non-Safety Related, including: 1. Intake Screenhouse 2. Discharge Basin and Discharge Basin Control Structure 3. Cooling Towers 4. Distribution Basin 5. Recycle Canal and Recycle Canal Control Structure 6. Cooling Tower Return Canal and Weir Dam 7. Discharge Canal and Discharge Canal Control Structures 8. Cooling Tower Pumphouse 9. Cooling Tower Control Houses 10. Deicing Pumphouse 11. Intake Canal Flow Baffles	No	N/A
SRP Evaluation Group: Electrical and Instrumentation and Controls (The Electrical Commodities AMR includes electrical commodity groups based upon an "in-scope" bounding approach.)		
240/120V Miscellaneous Auxiliaries	Yes	Section 2.5
480V Electrical	Yes	Section 2.5
4.16kV Electrical	Yes	Section 2.5
Annunciators	Yes	Section 2.5
Auxiliary Start-Up/Standby Transformers	Yes	Section 2.5
Communications	Yes	Section 2.5
Cooling Tower Substation	Yes	Section 2.5
Computer	Yes	Section 2.5
DC Auxiliaries	Yes	Section 2.5
Electrical Distribution	Yes	Section 2.5
Engineered Safety Feature Actuation System	Yes	Section 2.5
EQ Ancillary Equipment/Miscellaneous Tasks	Yes	Section 2.5
Event Monitoring	Yes	Section 2.5
Full Length Rod Control	Yes	Section 2.5
Ground and Cathodic Protection	Yes	Section 2.5
Heat Tracing	Yes	Section 2.5
Instrument Power Sources	Yes	Section 2.5
Main Generator, Exciter and Transformer	Yes	Section 2.5
Miscellaneous Plant Instruments	Yes	Section 2.5
Nuclear Instrumentation	Yes	Section 2.5
Plant Substation	Yes	Section 2.5
Reactor Control	Yes	Section 2.5

Table 2.2-1 Plant Level Scoping Results

Description	Within Scope of License Renewal?	LRA Section
Reactor Protection	Yes	Section 2.5
Rod Position Indication	Yes	Section 2.5
Site Lighting	Yes	Section 2.5
Vibration (General)	Yes	Section 2.5

2.3 Scoping and Screening Results: Mechanical Systems

2.3.1 Reactor Vessel, Internals, and Reactor Coolant System

The following systems are addressed in this section:

- Pressurizer System (Section 2.3.1.1)
- Reactor Coolant System (Section 2.3.1.2)
- Reactor Internals System (Section 2.3.1.3)
- Reactor Vessel System (Section 2.3.1.4)
- Steam Generator System (Section 2.3.1.5)

2.3.1.1 Pressurizer System

System Description

The Pressurizer (PS) System is designed to maintain the required reactor coolant pressure during steady-state operation, limit the pressure changes caused by coolant thermal expansion and contraction during normal load transients, and prevents the pressure in the RC System from exceeding the design pressure. The PS System is an operating system.

The PS System for each PINGP Unit consists of the pressurizer vessel, replaceable direct immersion heaters, a spray head and all other internal components. The surge line attached to the bottom of the pressurizer connects the pressurizer to the hot leg of a reactor coolant loop. Pressure in the RC System is controlled by the pressurizer, where water and steam pressure are maintained through the use of heaters and sprays. Steam can either be formed by the heaters, or condensed by the pressurizer spray. The electric heaters located in the lower section of the vessel pressurize and maintain the pressure of the RC System by keeping the water and steam in the pressurizer at the system saturation temperature.

The PS System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions of the PS System support Fire Protection and Station Blackout event requirements based on the criteria of CFR 54.4(a)(3). The portions of the PS System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the PS System containing components subject to an AMR include the pressurizer and the internal components that perform an intended function.

System Function Listing

A comprehensive listing of functions associated with the PS System, or specific components contained in the system, is provided in the summary below.

Code PS-01	Cri 1	Cri 2	Cri 3				
Contains SCs that are part of the Reactor Coolant Pressure Boundary.			FP	EQ	PTS	AT	SB
	X						

Comment: The PS System provides a boundary for containing the reactor coolant under operating temperature and pressure conditions. It serves to confine radioactive material and limits to acceptable values any release of radioactive material to the secondary system and to other parts of the plant under conditions of either normal or abnormal reactor operation.

Code PS-02	Cri 1	Cri 2	Cri 3				
Provide pressure control of the Reactor Coolant System.			FP	EQ	PTS	AT	SB
	X						

Comment: The PS System maintains the required reactor coolant pressure during steady-state operation, limits the pressure changes caused by coolant thermal expansion and contraction during normal load transients, and prevents the pressure in the RC System from exceeding the design pressure.

Code PS-FP	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains required equipment that performs a Fire Protection Safe Shutdown RCS Inventory Control function.

Code PS-SB	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.			FP	EQ	PTS	AT	SB
							X

Comment: Components of the PS System support primary system integrity (reactor coolant pressure boundary) and RC System pressure control for the SBO event.

USAR Reference

Additional PS System details are provided in Section 4.1, Section 4.4.2.1, and Section 4.4.3.1 of the USAR.

License Renewal Drawings

The License Renewal drawings for the PS System are listed below:

Common	Unit 1	Unit 2
None	LR-XH-1-7	LR-XH-1001-3

Components Subject to an AMR

The components of the PS System that require an AMR are addressed in Table 2.3.1-1 along with each component's intended function(s).

Table 2.3.1-1 Pressurizer System

Components	Intended Function
BOLTING/FASTENERS (PRIMARY CLOSURES)	PRESSURE BOUNDARY
HEATER SHEATHS	PRESSURE BOUNDARY
HEATER WELLS	PRESSURE BOUNDARY
INSTRUMENT NOZZLES	PRESSURE BOUNDARY
LOWER HEAD	PRESSURE BOUNDARY
MANWAY COVER	PRESSURE BOUNDARY
MANWAY FLANGE	PRESSURE BOUNDARY
RELIEF NOZZLE	PRESSURE BOUNDARY
RELIEF NOZZLE SAFE END	PRESSURE BOUNDARY
SAFETY NOZZLE SAFE ENDS	PRESSURE BOUNDARY
SAFETY NOZZLES	PRESSURE BOUNDARY
SHELL	PRESSURE BOUNDARY
SPRAY HEAD	SPRAY
SPRAY HEAD COUPLING	PRESSURE BOUNDARY
SPRAY HEAD LOCKING BAR	STRUCTURAL SUPPORT
SPRAY NOZZLE	PRESSURE BOUNDARY
SPRAY NOZZLE SAFE END	PRESSURE BOUNDARY
SPRAY NOZZLE THERMAL SLEEVE	PRESSURE BOUNDARY
SUPPORT SKIRT AND FLANGE	STRUCTURAL SUPPORT
SURGE NOZZLE	PRESSURE BOUNDARY
SURGE NOZZLE SAFE END	PRESSURE BOUNDARY
SURGE NOZZLE THERMAL SLEEVE	PRESSURE BOUNDARY
UPPER HEAD	PRESSURE BOUNDARY

2.3.1.2 Reactor Coolant System

System Description

The Reactor Coolant (RC) System is designed to transfer the heat generated in the core to the steam generators and provides a boundary to contain the coolant under operating temperature and pressure conditions. It also serves to confine radioactive material and limits to acceptable values any release of radioactive material. The RC System includes the Reactor Vessel Water Inventory Indication, Reactor Coolant Gas Vent and the Reactor Coolant Pump Oil Lift sub-systems. Portions of the RC System are an operating system and portions are a standby system.

The RC System for each PINGP Unit consists of two identical heat transfer loops connected in parallel to the reactor vessel. Each loop contains a reactor coolant pump, a steam generator, and a resistance temperature detector manifold. The RC System also includes a pressurizer relief tank, pressurizer safety valves, pressurizer relief valves, thermal sleeves and the necessary piping, valves and instrumentation. The RC System transfers the heat generated in the core to the steam generators where steam is generated to drive the turbine generator. Borated demineralized water is circulated at a flow rate and temperature to achieve the proper reactor core thermal hydraulic performance. The water also acts as a neutron moderator and reflector, and as a solvent for the neutron absorber used in chemical shim control. The RC System provides a boundary for containing the coolant under operating temperature and pressure conditions. It serves to confine radioactive material and limits to acceptable values any release of radioactive material to the secondary system and to other parts of the plant under conditions of either normal or abnormal reactor operation. During transient operation the system’s heat capacity attenuates thermal transients. The RC System accommodates coolant volume changes within the bounds of the protection system criteria.

The Reactor Vessel Water Inventory Indication sub-system for each PINGP Unit consists of three differential pressure transmitters, impulse lines, hydraulic isolators and the necessary piping, valves and instrumentation. The sub-system senses differential pressure via impulse lines connected to the reactor vessel head, a hot leg and the bottom of the reactor vessel via a seal table connection. The Reactor Coolant Gas Vent sub-system for each PINGP Unit consists of six remotely operated solenoid valves and the necessary piping, valves and instrumentation, designed to permit the operator to vent the reactor vessel head or pressurizer steam space from the control room under post-accident conditions. The system provides a redundant vent path either to the containment directly or to the pressurizer relief tank (PRT). The Reactor

Coolant Pump Oil Lift sub-system for each PINGP Unit consists of a motor and pump mounted on each reactor coolant pump (RCP), and the necessary piping, valves and instrumentation, designed to provide high pressure oil lift to the RCPs during startup to reduce motor starting torque.

The RC System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the RC System support Environmental Qualification, Fire Protection, and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the RC System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the RC System containing components subject to an AMR include the heat transfer loop and the pressurizer relief tank, pumps, piping and valves. The portions of the Reactor Vessel Water Inventory Indication and Reactor Coolant Gas Vent sub-systems containing components subject to an AMR begin at the connection to the reactor and pressurizer and extend to the instruments or discharge connections including the piping and valves. The portions of the Oil Lift sub-system containing components subject to an AMR include the pumps, piping and valves.

System Function Listing

A comprehensive listing of functions associated with the RC System is provided in the summary below.

Code RC-01	Cri 1	Cri 2	Cri 3				
Provide heat removal from the RC System during and following design basis events.			FP	EQ	PTS	AT	SB
	X						

Comment: The principle heat removal systems which are interconnected with the RC System are the MS, FW, SI and RH Systems.

Code RC-02	Cri 1	Cri 2	Cri 3				
Contains SCs that are part of the Reactor Coolant Pressure Boundary.			FP	EQ	PTS	AT	SB
	X						

Comment: The RC System provides a boundary for containing the reactor coolant under operating temperature and pressure conditions. It serves to confine radioactive material and limits to acceptable values any release of radioactive material to the secondary system and to other parts of the plant under conditions of either normal or abnormal reactor operation.

Code RC-03	Cri 1	Cri 2	Cri 3				
The Reactor Vessel Water Inventory Indication sub-system is provided for verification and long term surveillance of core cooling.			FP	EQ	PTS	AT	SB

Comment: The Reactor Vessel Water Inventory Indication sub-system provides continuous indication of reactor water inventory to the control room. In addition to monitoring core cooling, it is also used for accident diagnosis and to determine reactor coolant inventory adequacy. Post accident monitoring is not a safety related function. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code RC-04	Cri 1	Cri 2	Cri 3				
Provide heat removal from the RC System under normal plant conditions.			FP	EQ	PTS	AT	SB

Comment: During power operation, the RC System transfers the heat generated in the core to the steam generators where steam is generated to drive the turbine generator. During shutdown and startup operation, the RC System transfers the heat generated in the core to the RH System. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code RC-05	Cri 1	Cri 2	Cri 3				
Circulates borated water as a moderator and reflector, and as a solvent for the neutron absorber used in the chemical shim control under normal and accident conditions.			FP	EQ	PTS	AT	SB
	X						

Comment: Forced circulation is provided by the reactor coolant pumps. The layout of the system assures the natural circulation capability following a loss of flow to permit plant cool-down without overheating the core.

Code RC-06	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon to perform a Primary Containment Boundary Function.			FP	EQ	PTS	AT	SB
	X						

Comment: The RC System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code RC-07	Cri 1	Cri 2	Cri 3				
The Reactor Coolant Pump Motor Oil Lift sub-system provides high pressure oil lift to the RCPs during startup to reduce motor starting torque.			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code RC-08	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Reactor Coolant Gas Vent sub-system is designed to vent non-condensable gases from the reactor vessel head and pressurizer steam space during post-accident conditions.	X						

Comment: The purpose of venting is to prevent possible interference with core cooling. This sub-system is also used for venting during RC System draindown and fill and vent.

Code RC-09	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Contains components that provide input to the reactor protection and engineered safeguards features equipment.	X						

Comment: The instrumentation provided ensures safe and orderly operation of systems and processes over the full operating range of the plant.

Code RC-EQ	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.				X			

Comment: The RC System contains required components listed in the EQ Master List that are important to safety and are required to perform their safety related function when exposed to a worst case post accident environment.

Code RC-FP	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			X				

Comment: The RC System contains required equipment that performs a Fire Protection Safe Shutdown Reactor Coolant System Inventory Control function.

Code RC-NSAS	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.		X					

Comment: The RC System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code RC-SB	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.			FP	EQ	PTS	AT	SB
							X

Comment: Components of the RC System support core heat removal (establishment of natural circulation including vessel and pressurizer venting), primary system integrity (reactor coolant pressure boundary), and reactivity control (instrument trips, reactor trip and control rod shutdown) for the SBO event. Portions of the RC System which form part of the mechanical pressure boundary with a system in-scope for SBO Event coping are included in-scope to support this pressure boundary function.

USAR Reference

Additional RC System details are provided in Section 4.1, Section 4.5, Section 7.10.3.4.3, and Figure 4.3-2 of the USAR.

License Renewal Drawings

The License Renewal drawings for the RC System are listed below:

Common	Unit 1	Unit 2
None	LR-XH-1-7	LR-XH-1001-3

Components Subject to an AMR

The components of the RC System that require an AMR are addressed in Table 2.3.1-2 along with each component's intended function(s). Major components are addressed separately and therefore are not identified in Table 2.3.1-2.

Table 2.3.1-2 Reactor Coolant System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	HEAT TRANSFER PRESSURE BOUNDARY
HYDRAULIC ISOLATORS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY

Table 2.3.1-2 Reactor Coolant System

Components	Intended Function
RESTRICTING ORIFICES	PRESSURE BOUNDARY THROTTLE
RUPTURE DISCS	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMAL SLEEVES	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.1.3 Reactor Internals System

System Description

The Reactor Internals (RX) System is designed to support, align, and guide the core components, direct the coolant flow to and from the core components, and to support and guide the in-core instrumentation. The RX System includes the Nuclear Fuel sub-system. The RX System is an operating system.

The RX System for each PINGP Unit consists of the reactor vessel internals and reactor core, which includes the Nuclear Fuel sub-system. The core, consisting of the fuel assemblies and control rods, provides and controls the heat source for the reactor operation. The internals, consisting of the upper and lower core support structure, are designed to support, align, and guide the core components, direct the coolant flow to and from the core components, and to support and guide the in-core instrumentation.

The RX System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions of the RX System support Fire Protection and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the RX System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the RX System containing components subject to an AMR include the components contained in the reactor vessel that perform an intended function.

System Function Listing

A comprehensive listing of functions associated with the RX System, or specific components contained in the system, is provided in the summary below.

Code RX-01	Cri 1	Cri 2	Cri 3				
Support, align and guide the core components and in-core instrumentation.			FP	EQ	PTS	AT	SB
	X						

Comment: The internals, consisting of the upper and lower core support structure, are designed to support, align, and guide the core components, direct the coolant flow to and from the core components, and to support and guide the in-core instrumentation.

Code RX-02	Cri 1	Cri 2	Cri 3				
Provide sufficient control rod worth to shut the reactor down.			FP	EQ	PTS	AT	SB
	X						

Comment: The control rods provide sufficient control rod worth to shut the reactor down in the hot condition at any time during the life cycle with the most reactive rod cluster control assembly stuck in the fully withdrawn position.

Code RX-03	Cri 1	Cri 2	Cri 3				
The Nuclear Fuel sub-system generates heat for power generation and serves as a barrier between fission product accumulation and the environment.			FP	EQ	PTS	AT	SB
	X						

Comment: The fuel consists of cylindrical pellets of slightly enriched uranium dioxide inserted into ZIRLO/Zircaloy cladding tubes.

Code RX-04	Cri 1	Cri 2	Cri 3				
Provide passageway for the distribution of the reactor coolant flow to the reactor core.			FP	EQ	PTS	AT	SB
	X						

Comment: The lower core support structure and principally the core barrel serve to provide passageways and control for the coolant flow.

Code RX-05	Cri 1	Cri 2	Cri 3				
Provide gamma and neutron shielding for the reactor vessel.			FP	EQ	PTS	AT	SB
	X						

Comment: A one-piece thermal shield, concentric with the reactor core, is located between the core barrel and the reactor vessel. The shield protects the vessel by attenuating much of the gamma radiation and some of the fast neutrons which escape from the core. This shield minimizes thermal stresses in the vessel which result from heat generated by the absorption of gamma energy.

Code RX-06 Provide secondary core support for limiting the core support downward displacement.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: Vertically downward loads are carried by the lower core plate partially into the lower core plate support flange on the core barrel shell and partially through the lower support columns to the bottom support plate and thence through the core barrel shell to the core barrel flange supported by the vessel head flange.

Code RX-07 Provide heat source for power generation.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Heat generated in the core is transferred to the RC System and then to the steam generators where steam is generated to drive the turbine generator. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code RX-FP Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains equipment that performs a Fire Protection Reactivity Control Function.

Code RX-SB Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: Reactor vessel internals, including control rods, that perform reactor shutdown, support reactivity control for the SBO event.

USAR Reference

Additional RX System details are provided in Section 3.1.1 and Section 3.6.2 of the USAR.

License Renewal Drawings

The License Renewal drawings for the RX System are listed below:

Common	Unit 1	Unit 2
None	None	None

Components Subject to an AMR

The components of the RX System that require an AMR are addressed in Table 2.3.1-3 along with each component's intended function(s).

Table 2.3.1-3 Reactor Internals System

Components	Intended Function
BAFFLE AND FORMER PLATES	PRESSURE BOUNDARY SHIELDING STRUCTURAL SUPPORT
BAFFLE AND FORMER PLATES FASTENERS	PRESSURE BOUNDARY STRUCTURAL SUPPORT
BMI COLUMN CRUCIFORMS	STRUCTURAL SUPPORT
BMI COLUMNS AND FLUX THIMBLE GUIDES	STRUCTURAL SUPPORT
CLEVIS INSERT BOLTS	STRUCTURAL SUPPORT
CORE BARREL AND CORE BARREL FLANGE	PRESSURE BOUNDARY SHIELDING STRUCTURAL SUPPORT
CORE BARREL OUTLET NOZZLES	PRESSURE BOUNDARY
DIFFUSER PLATE	PRESSURE BOUNDARY
FLUX THIMBLE TUBES	PRESSURE BOUNDARY
HEAD AND VESSEL ALIGNMENT PINS	STRUCTURAL SUPPORT
HEAD COOLING SPRAY NOZZLES	PRESSURE BOUNDARY
HOLDDOWN SPRING	STRUCTURAL SUPPORT
LOWER CORE PLATE	PRESSURE BOUNDARY STRUCTURAL SUPPORT
LOWER CORE PLATE FUEL ALIGNMENT PINS	PRESSURE BOUNDARY STRUCTURAL SUPPORT
LOWER SUPPORT COLUMN BOLTS	STRUCTURAL SUPPORT
LOWER SUPPORT COLUMNS	STRUCTURAL SUPPORT
LOWER SUPPORT FORGING	PRESSURE BOUNDARY STRUCTURAL SUPPORT
RADIAL SUPPORT KEYS AND CLEVIS INSERTS	STRUCTURAL SUPPORT

Table 2.3.1-3 Reactor Internals System

Components	Intended Function
ROD CLUSTER CONTROL ASSEMBLIES GUIDE TUBES	STRUCTURAL SUPPORT
ROD CLUSTER CONTROL ASSEMBLIES GUIDE TUBE FASTENERS	STRUCTURAL SUPPORT
ROD CLUSTER CONTROL ASSEMBLIES GUIDE TUBE PINS	STRUCTURAL SUPPORT
SECONDARY CORE SUPPORT	PRESSURE BOUNDARY STRUCTURAL SUPPORT
THERMAL SHIELDS	SHIELDING
UPPER CORE PLATE	PRESSURE BOUNDARY STRUCTURAL SUPPORT
UPPER CORE PLATE ALIGNMENT KEYS	STRUCTURAL SUPPORT
UPPER CORE PLATE FUEL ALIGNMENT PINS	PRESSURE BOUNDARY STRUCTURAL SUPPORT
UPPER INSTRUMENTATION COLUMNS, CONDUITS, AND SUPPORTS	STRUCTURAL SUPPORT
UPPER SUPPORT COLUMNS	STRUCTURAL SUPPORT
UPPER SUPPORT COLUMN FASTENERS	STRUCTURAL SUPPORT
UPPER SUPPORT PLATE ASSEMBLY	STRUCTURAL SUPPORT

2.3.1.4 Reactor Vessel System

System Description

The Reactor Vessel (RV) System is designed to provide a boundary for containing the reactor coolant under operating temperature and pressure conditions and serves to confine radioactive material. In addition, the reactor vessel provides structural support for the reactor internals, contains and directs coolant flow, provides penetrations for monitoring and control and acts as a fission product barrier. The RV System includes the Incore Instrumentation sub-system, which provides information on neutron flux and fuel assembly outlet temperatures. The RV System is an operating system.

The reactor vessel for each PINGP Unit consists of a cylindrical vessel with a hemispherical bottom and a flanged and gasketed removable upper head, the control rod drive mechanisms and the necessary piping, valves and instrumentation. Two metallic O-rings seal the reactor vessel when the reactor closure head is bolted in place. A leakoff connection is provided between the two O-rings to monitor leakage across the inner O-ring. In addition, a leak-off connection is also provided beyond the outer O-ring seal. Control rod drive mechanisms (CRDMs) are positioned on the reactor closure head.

The Incore Instrumentation sub-system for each PINGP Unit consists of stainless steel tubes which extend from the bottom of the reactor vessel down through the concrete shield area and up to a thimble seal table.

The RV System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions of the RV System support Fire Protection, Pressurized Thermal Shock, and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the RV System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the RV System containing components subject to an AMR begin at the reactor vessel and extend to the nozzle connections to the RC System piping and include the incore instruments, CRDMs, and leak-off line components.

System Function Listing

A comprehensive listing of functions associated with the RV System, or specific components contained in the system, is provided in the summary below.

Code RV-01	Cri 1	Cri 2	Cri 3				
Contains SCs that are part of the Reactor Coolant Pressure Boundary.			FP	EQ	PTS	AT	SB
	X						

Comment: The reactor vessel provides a boundary for containing the reactor coolant under operating temperature and pressure conditions. It serves to confine radioactive material and limits to acceptable values any release of radioactive material to the secondary system and to other parts of the plant under conditions of either normal or abnormal reactor operation.

Code RV-02	Cri 1	Cri 2	Cri 3				
To provide structural support for the reactor core and internals.			FP	EQ	PTS	AT	SB
	X						

Comment: The reactor vessel serves as the pressure boundary housing and structural support for the heat generating core, control mechanisms, and circulating channels (i.e., reactor internals).

Code RV-03	Cri 1	Cri 2	Cri 3				
Provide penetrations for control and monitoring of power generated within the fuel assemblies.			FP	EQ	PTS	AT	SB
	X						

Comment: The reactor vessel contains penetrations for the rod cluster control assemblies.

Code RV-04	Cri 1	Cri 2	Cri 3				
To provide for flow and containment of reactor coolant used to remove the heat produced by the reactor.			FP	EQ	PTS	AT	SB
	X						

Comment: The RV System contains the reactor coolant around the reactor core and directs the coolant flow into the core and out into the reactor piping and upper head.

Code RV-05	Cri 1	Cri 2	Cri 3				
The Incore Instrument sub-system provides information on neutron flux and fuel assembly outlet temperatures.			FP	EQ	PTS	AT	SB

Comment: The incore instrumentation is designed to yield information on the neutron flux distribution and fuel assembly outlet temperatures at selected core locations. The system provides means for acquiring data only, and performs no operational plant control. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code RV-FP	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: The RV System contains required equipment that performs a Fire Protection Safe Shutdown RCS Inventory Control function.

Code RV-PT	Cri 1	Cri 2	Cri 3				
Contains SSC relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.61, Pressurized Thermal Shock.			FP	EQ	PTS	AT	SB
					X		

Comment: 10 CFR 50.61 provides requirements to maintain fracture toughness of the reactor vessel beltline materials to protect against Pressurized Thermal Shock Events.

Code RV-SB	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Contains SSC relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.							X

Comment: The RV System supports core heat removal (establishment of natural circulation), primary system integrity (reactor coolant pressure boundary), and reactivity control (control rod shutdown) for the SBO event.

USAR Reference

Additional RV System details are provided in Section 4.2, Section 7.6, and Figure 3.1-2 of the USAR.

License Renewal Drawings

The License Renewal drawings for the RV System are listed below:

Common	Unit 1	Unit 2
None	LR-XH-1-7	LR-XH-1001-3

Components Subject to an AMR

The components of the RV System that require an AMR are addressed in Table 2.3.1-4 along with each component's intended function(s).

Table 2.3.1-4 Reactor Vessel System

Components	Intended Function
BOTTOM HEAD DOME	PRESSURE BOUNDARY
BOTTOM HEAD TORUS	PRESSURE BOUNDARY
BOTTOM MOUNTED INSTRUMENTATION (BMI) GUIDE TUBES & FITTINGS	PRESSURE BOUNDARY
CLOSURE HEAD DOME	PRESSURE BOUNDARY
CLOSURE HEAD FLANGE	PRESSURE BOUNDARY
CLOSURE HEAD LIFTING LUGS	STRUCTURAL SUPPORT
CLOSURE HEAD STUDS, NUTS, & WASHERS	PRESSURE BOUNDARY
CORE SUPPORT PADS	STRUCTURAL SUPPORT
CONTROL ROD DRIVE MECHANISM (CRDM) HOUSING TUBES	PRESSURE BOUNDARY
CRDM PRESSURE HOUSINGS	PRESSURE BOUNDARY
CRDM ROD TRAVEL HOUSINGS	PRESSURE BOUNDARY

Table 2.3.1-4 Reactor Vessel System

Components	Intended Function
EXTERNAL SUPPORT BRACKETS	STRUCTURAL SUPPORT
FLANGE O-RING LEAK DETECTION TUBES	PRESSURE BOUNDARY
INCORE INSTRUMENTATION SEAL TABLE AND FITTINGS	PRESSURE BOUNDARY STRUCTURAL SUPPORT
INSTRUMENTATION TUBE PENETRATIONS (BOTTOM HEAD)	PRESSURE BOUNDARY
INSTRUMENTATION TUBE PENETRATIONS (TOP HEAD)	PRESSURE BOUNDARY
INTERMEDIATE SHELL INCLUDING BELTLINE WELDS	PRESSURE BOUNDARY
LOWER SHELL INCLUDING BELTLINE WELDS	PRESSURE BOUNDARY
NOZZLE SUPPORT PADS	STRUCTURAL SUPPORT
PRIMARY INLET NOZZLES	PRESSURE BOUNDARY
PRIMARY NOZZLE SAFE ENDS AND WELDS	PRESSURE BOUNDARY
PRIMARY OUTLET NOZZLES	PRESSURE BOUNDARY
RPV REFUELING SEAL LEDGE	PRESSURE BOUNDARY
RVLIS PENETRATION PIPE NOZZLE	PRESSURE BOUNDARY
SAFETY INJECTION NOZZLES	PRESSURE BOUNDARY
SAFETY INJECTION NOZZLE SAFE ENDS AND WELDS	PRESSURE BOUNDARY
UPPER (NOZZLE) SHELL INCLUDING BELTLINE WELDS	PRESSURE BOUNDARY
VENT PENETRATION PIPE NOZZLE	PRESSURE BOUNDARY
VENTILATION SHROUD SUPPORT RING	STRUCTURAL SUPPORT
VESSEL FLANGE	PRESSURE BOUNDARY

2.3.1.5 **Steam Generator System**

System Description

The Steam Generator (SG) System transfers heat from the RC System to the secondary systems during normal plant conditions, producing steam for use in the turbine generator, and during and following design basis events to provide

RC System heat removal. The SG System forms part of the reactor coolant, primary containment and secondary pressure boundary. The SG System is an operating system.

The SG System for each PINGP Unit consists of two vertical shell and U-tube steam generators and the associated components. The Unit 1 steam generators were designed and supplied by Framatome-ANP. The Unit 2 steam generators were designed and supplied by Westinghouse. The heat transfer tubes are Inconel (Alloy 690 for Unit 1 and 600 for Unit 2). Reactor coolant enters the inlet side of the channel head at the bottom of the steam generator through the inlet nozzle, flows through the U-tubes to an outlet channel and leaves the generator through another bottom nozzle. The inlet and outlet channels are separated by a partition. Manways are provided to permit access to the U-tubes and moisture separating equipment. Feedwater to the steam generator enters just above the top of the U-tubes through a feedwater ring. The water flows downward through an annulus between the tube wrapper and the shell and then upward through the tube bundle where part of it is converted to steam. The steam-water mixture from the tube bundle passes through moisture separator equipment to ensure that high-quality steam is produced by the steam generators. In the Unit 1 steam outlet nozzle there are seven (7) Alloy 600 flow limiting orifices that limit the flow during main steam line break.

The SG System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions of the SG System support Fire Protection and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the SG System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the SG System containing components subject to an AMR includes the steam generator components, beginning at the nozzle connections to the interfacing piping systems including the level taps, the SG tubes and tube supports and the Unit 1 steam outlet orifice.

System Function Listing

A comprehensive listing of functions associated with the SG System, or specific components contained in the system, is provided in the summary below.

Code SG-01	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon to provide a Reactor Coolant Pressure Boundary Function.			FP	EQ	PTS	AT	SB
	X						

Comment: The SG System provides a boundary for containing the coolant under operating temperature and pressure conditions. It serves to confine radioactive material and limits to acceptable values any release of radioactive material to the secondary system and to other parts of the plant under conditions of either normal or abnormal reactor operation.

Code SG-02	Cri 1	Cri 2	Cri 3				
Transfer heat from the reactor coolant to the secondary systems under normal conditions and during and following design basis events.			FP	EQ	PTS	AT	SB
	X						

Comment: The steam generators provide the primary method for decay heat removal from normal operating conditions to a reactor coolant temperature of approximately 350 degrees F.

Code SG-03	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon to perform a Primary Containment Boundary Function.			FP	EQ	PTS	AT	SB
	X						

Comment: The SG System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code SG-04	Cri 1	Cri 2	Cri 3				
Limit the rate of steam release in the event of a main steam line break.			FP	EQ	PTS	AT	SB
	X						

Comment: The Unit 1 steam generators contain a flow limiter in the steam exit nozzle to limit steam flow in the event of a main steam line break.

Code SG-FP	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains required equipment that performs a Fire Protection Safe Shutdown Decay Heat Removal function.

Code SG-SB		Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.							X

Comment: The steam generators provide secondary side heat removal and form part of the reactor coolant pressure boundary (i.e., support primary system integrity) in support of SBO event coping.

USAR Reference

Additional SG System details are provided in Section 1.4.2, Section 4.3.2.1.1, and Section 4.3.2.2.2 of the USAR.

License Renewal Drawings

The License Renewal drawings for the SG System are listed below:

Common	Unit 1	Unit 2
LR-39250	LR-39218	LR-39219
LR-88740	LR-39222	LR-39223
	LR-XH-1-7	LR-XH-1001-3

Components Subject to an AMR

The components of the SG System that require an AMR are addressed in Table 2.3.1-5 along with each component's intended function(s).

Table 2.3.1-5 Steam Generator System

Components	Intended Function
ANTIVIBRATION BARS (UNIT 2)	STRUCTURAL SUPPORT
ANTIVIBRATION BARS AND HARDWARE (UNIT 1)	STRUCTURAL SUPPORT
ANTIVIBRATION BARS HARDWARE (UNIT 2)	STRUCTURAL SUPPORT
BLOWDOWN PIPING CONNECTIONS	PRESSURE BOUNDARY
BOLTING/FASTENERS (PRIMARY CLOSURES)	PRESSURE BOUNDARY
BOLTING/FASTENERS (SECONDARY CLOSURES)	PRESSURE BOUNDARY
CHANNEL HEAD AND CLADDING	PRESSURE BOUNDARY
DIVIDER PLATE	PRESSURE BOUNDARY
FEEDWATER INLET NOZZLE	PRESSURE BOUNDARY

Table 2.3.1-5 Steam Generator System

Components	Intended Function
FEEDWATER INLET NOZZLE THERMAL SLEEVE (UNIT 1)	PRESSURE BOUNDARY
FEEDWATER INLET NOZZLE THERMAL SLEEVE (UNIT 2)	PRESSURE BOUNDARY
LOWER SHELL	PRESSURE BOUNDARY
MANWAY COVERS WITH INSERTS (REACTOR COOLANT SIDE)	PRESSURE BOUNDARY
NOZZLE DAM RINGS FOR ATTACHMENTS TO NOZZLE DAMS	STRUCTURAL SUPPORT
PRIMARY INLET AND OUTLET NOZZLES	PRESSURE BOUNDARY
PRIMARY NOZZLE SAFE ENDS (UNIT 1)	PRESSURE BOUNDARY
RECIRCULATION NOZZLE (UNIT 1)	PRESSURE BOUNDARY
SECONDARY CLOSURES (UNIT 2)	PRESSURE BOUNDARY
SECONDARY CLOSURES WITH INSERT (UNIT 1)	PRESSURE BOUNDARY
STEAM FLOW LIMITER (UNIT 1)	THROTTLE
STEAM GENERATOR SHELL PENETRATIONS (INDICATION AND SAMPLE)	PRESSURE BOUNDARY
STEAM OUTLET NOZZLE	PRESSURE BOUNDARY
TRANSITION CONE	PRESSURE BOUNDARY
TUBE BUNDLE WRAPPER AND WRAPPER SUPPORT SYSTEM	PRESSURE BOUNDARY STRUCTURAL SUPPORT
TUBE PLUGS	PRESSURE BOUNDARY
TUBE SUPPORT PLATES (UNIT 1)	STRUCTURAL SUPPORT
TUBE SUPPORT PLATES (UNIT 2)	STRUCTURAL SUPPORT
TUBESHEET WITH CLADDING	PRESSURE BOUNDARY
UPPER SHELL	PRESSURE BOUNDARY
U-TUBES (UNIT 1)	HEAT TRANSFER PRESSURE BOUNDARY
U-TUBES (UNIT 2)	HEAT TRANSFER PRESSURE BOUNDARY

2.3.2 Engineered Safety Features

The following systems are addressed in this section:

- Containment Spray 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 Spray System

System Description

The Containment Spray (CS) System is an engineered safety system designed to remove heat from containment under accident conditions, to depressurize and cool containment and thereby ensure that containment does not exceed its design value and also to limit the driving potential for fission product leakage. The CS System includes the Caustic Addition sub-system designed to add a caustic solution (sodium hydroxide (NaOH)) to the spray water to reduce the probability of stress corrosion cracking of stainless steel RH System components during the recirculation phase and to enhance the iodine absorption capacity of the containment spray. The CS System is a standby system.

The CS System for each PINGP Unit consists of two pumps, spray ring headers and nozzles, and the necessary piping, valves and instrumentation. The containment spray pumps take suction from the refueling water storage tank (RWST) and discharge to the ring header and spray nozzles located in containment. The caustic addition portion of the CS System for each PINGP Unit consists of a standpipe (tank), vacuum breakers, recirculation pump, surge tank, feed tank, and the necessary piping, valves and instrumentation designed to provide a direct additive (NaOH) to the spray system whenever spray is actuated.

The CS System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the CS System support Environmental Qualification, Fire Protection, and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the CS System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the CS System containing components subject to an AMR begin at the connection to the RWST and extend to the spray nozzles located inside containment and include caustic addition standpipe and equipment and the pumps, tanks, piping and valves.

System Function Listing

A comprehensive listing of functions associated with the CS System, or specific components contained in the system, is provided in the summary below.

Code CS-01	Cri 1	Cri 2	Cri 3				
Remove heat from the reactor containment following a loss-of-coolant or main steam line break accident.			FP	EQ	PTS	AT	SB
	X						

Comment: The CS System, working in parallel with the Containment Air Cooling sub-system, is designed to remove sufficient heat from the reactor containment to keep the containment from exceeding the design pressure and temperature.

Code CS-02	Cri 1	Cri 2	Cri 3				
Remove elemental iodine from the containment atmosphere during accident conditions.			FP	EQ	PTS	AT	SB
	X						

Comment: The spray system washing action serves as a removal mechanism for fission products postulated to be dispersed in the containment atmosphere.

Code CS-03	Cri 1	Cri 2	Cri 3				
The Caustic Addition sub-system adds NaOH to spray water to reduce the probability of SCC of stainless RH System components during the recirculation phase and to enhance iodine absorption by the containment spray.			FP	EQ	PTS	AT	SB
	X						

Comment: A NaOH solution is supplied to the CS pump suctions to assure a pH of less than 10.5 in the spray and greater than 7.0 in the recirculated water. A minimum pH of 7.0 is recommended for post accident water to reduce the probability of stress corrosion cracking of austenitic stainless steel.

Code CS-04	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon to perform a Primary Containment Boundary Function.			FP	EQ	PTS	AT	SB
	X						

Comment: The CS System contains required components that perform a primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code CS-EQ Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
				X			

Comment: The CS System contains required components listed in the EQ Master List that are important to safety and are required to perform their safety related function when exposed to a worst case post accident environment.

Code CS-FP Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains associated circuits of concern related to the Fire Protection Safe Shutdown Decay Heat Removal function and contains associated circuits of concern related to the Fire Protection Safe Shutdown RCS Inventory Control function.

Code CS-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The CS System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code CS-SB Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: PINGP systems which form part of the containment isolation boundary are in scope for License Renewal to support the SBO containment isolation functional requirement.

USAR Reference

Additional CS System details are provided in Section 6.3.1.5, Section 6.4.1, Section 6.4.2.1, Section 6.4.3.2, and Section 14.9.6.3 of the USAR.

License Renewal Drawings

The License Renewal drawings for the CS System are listed below:

Common	Unit 1	Unit 2
LR-39237 LR-39252	None	None

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.2-1 along with each component's intended function(s).

Table 2.3.2-1 Containment Spray System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	HEAT TRANSFER PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
SIGHT GLASSES	PRESSURE BOUNDARY
SPRAY NOZZLES	SPRAY
TANKS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.2.2 Residual Heat Removal System

System Description

The Residual Heat Removal (RH) System is an engineered safety system that serves dual functions. The system is relied upon during periods of reactor shutdown to remove residual and sensible heat from the reactor core and reduce the temperature of the RC System during plant cooldown and shutdown operations. During accident conditions, the RH System is aligned to take suction from the RWST to provide emergency core cooling low head safety injection. The RH System is a standby system.

The RH System for each PINGP Unit consists of two pumps, two heat exchangers, and the necessary piping, valves and instrumentation. During plant cooldown, when the RH System is operating, a letdown flow path is provided from the RH System to the VC System to provide pressure control and to remove corrosion impurities and fission products. The RH System is also used to fill and drain the refueling cavity during plant shutdown conditions. During accident conditions, the RH System is aligned to provide low head safety injection of borated water and low head recirculation of spilled reactor coolant back to the core through the residual heat exchangers. During the recirculation phase, the residual heat removal pumps can also be used to supply recirculated water to the high head safety injection pumps suction and to the suction of the containment spray pumps. However, analysis has shown that containment spray flow should not be required during the recirculation phase and therefore procedures covering switch over to recirculation call for securing containment spray.

The RH System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the RH System support Environmental Qualification, Fire Protection, and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the RH System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the RH System containing components subject to an AMR begin at the RC System hot leg suction motor valves and the containment sump B strainers and continue through the pumps and heat exchangers returning to the RC System, SI and CS System interface points, and include the necessary piping and valves.

System Function Listing

A comprehensive listing of functions associated with the RH System, or specific components contained in the system, is provided in the summary below.

Code RH-01	Cri 1	Cri 2	Cri 3				
Provide emergency core cooling and add shutdown reactivity by delivery of borated water during accident conditions.			FP	EQ	PTS	AT	SB
	X						

Comment: The RH System provides low head safety injection and recirculation during accident conditions. The RH heat exchangers transfer heat to the CC System for core cooling during the recirculation phase. The RH System may also be aligned to the SI System to support high head recirculation.

Code RH-02 To remove residual heat and sensible heat from the core and reduce the temperature in the RC System during the second phase of plant cooldown.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The RH heat exchangers transfer heat to the CC System to cool down the RC System and maintain refueling conditions. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code RH-03 Fill and drain the refueling cavity.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The RH System provides borated water to and from the RWST for refueling activities. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code RH-04 Provide a letdown flowpath when the RH System is operating.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Flow path from RH to VC provides pressure control and cleanup of RH/RCS during plant cooldown, refueling, and heatup operations. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code RH-05 Contains SCs relied upon to provide a Reactor Coolant Pressure Boundary Function.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The RH System provides a boundary for containing the coolant under operating temperature and pressure conditions. It serves to confine radioactive material and limits to acceptable values any release of radioactive material to the secondary system and to other parts of the plant under conditions of either normal or abnormal reactor operation.

Code RH-06 Contains SCs relied upon to perform a Primary Containment Boundary Function.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The RH System contains required components that perform a primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code RH-EQ Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
				X			

Comment: The RH System contains required components listed in the EQ Master List that are important to safety and are required to perform their safety related function when exposed to a worst case post accident environment.

Code RH-FP	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains required equipment that performs a Fire Protection Safe Shutdown Decay Heat Removal function, contains required equipment that performs a Fire Protection Safe Shutdown RCS Inventory Control function and contains associated circuits of concern related to the Fire Protection Safe Shutdown Decay Heat Removal function.

Code RH-NSAS	Cri 1	Cri 2	Cri 3				
Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The RH System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code RH-SB	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.			FP	EQ	PTS	AT	SB
							X

Comment: PINGP systems which form part of the containment isolation boundary are in scope for License Renewal to support the SBO containment isolation functional requirement. In addition to the RC System, PINGP systems which form part of the reactor coolant pressure boundary during SBO events are in-scope for License Renewal to support the SBO primary system integrity safety objective.

USAR Reference

Additional RH System details are provided in Section 6.2.1.1, Section 6.2.2.1, Section 10.2.3.2, and Section 10.2.4.1 of the USAR.

License Renewal Drawings

The License Renewal drawings for the RH System are listed below:

Common	Unit 1	Unit 2
None	LR-XH-1-31	LR-XH-1001-8

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.2-2 along with each component's intended function(s).

Table 2.3.2-2 Residual Heat Removal System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
ENCLOSURE TANKS	PRESSURE BOUNDARY
EXPANSION JOINTS	PRESSURE BOUNDARY
FILTER/STRAINER ELEMENTS	FILTER
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	HEAT TRANSFER PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY THROTTLE
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.2.3 Safety Injection System

System Description

The Safety Injection (SI) System is an engineered safety system used for emergency core cooling to automatically deliver borated cooling water to the reactor core in the event of a loss-of-coolant accident. This limits the fuel clad temperature and ensures that the core will remain substantially intact and in place, with its heat transfer geometry preserved. In addition, the SI System adds shutdown reactivity so that with a stuck rod there is no consequential damage to the RC System and the core remains in-place and intact. The SI System is a standby system.

The SI System for each PINGP Unit consists of two accumulators, a refueling water storage tank and two safety injection pumps. The RWST, in addition to its normal duty to supply borated water to the refueling cavity and SI accumulators, provides borated water to the safety injection pumps, residual heat removal pumps and the containment spray pumps during accident conditions, and becomes the source of makeup water for the VC System in the event that leakage makeup is required when the reactor makeup water storage tank is empty. The SI pumps discharge into the cold leg of the reactor coolant piping. The accumulators, which are passive components, discharge into the cold legs of the reactor coolant piping; they are located inside the containment. After the injection operation, coolant spilled from the break is cooled and returned to the RC System by the RH System. During the high head recirculation phase, suction to a safety injection pump is provided by the associated residual heat removal pump.

The SI System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the SI System support Environmental Qualification, Fire Protection, and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the SI System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the SI System containing components subject to an AMR begin at the RWST and extend through the SI pumps to the check valves located prior to the RC System and reactor vessel injection nozzles. Also included are the accumulators to the check valves located prior to the RC System.

System Function Listing

A comprehensive listing of functions associated with the SI System, or specific components contained in the system, is provided in the summary below.

Code SI-01	Cri 1	Cri 2	Cri 3				
Provide emergency core cooling and add shutdown reactivity by delivery of borated water during accident conditions.			FP	EQ	PTS	AT	SB
	X						

Comment: The SI Pumps provide active high head safety injection and recirculation during accident conditions. SI Accumulators provide passive injection during accident conditions.

Code SI-02	Cri 1	Cri 2	Cri 3				
Provide a borated water source to safeguards equipment during accident conditions.			FP	EQ	PTS	AT	SB
	X						

Comment: In addition to supplying the SI Pumps, the RWST provides borated water to the CS System and RH System.

Code SI-03 Contains SCs relied upon to provide a Reactor Coolant Pressure Boundary Function.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The SI System contains components used to provide a reliable interface boundary between the RC System and the SI System. Two normally closed valves in series are provided to separate the high pressure RC System from the SI System. The purpose of these valves is to prevent an overpressure failure of the low pressure system.

Code SI-04 Contains SCs relied upon to perform a Primary Containment Boundary Function.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The SI System contains required components that perform a primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code SI-05 Provides a borated water source to various safeguards and non-safeguards equipment during normal conditions.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The SI System provides a means to fill the SI Accumulators and refueling canal and also provides a backup water supply to the VC System charging pumps. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code SI-06 Provides a makeup source of water to the Spent Fuel Pool for alternate cooling capability.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Alternate Spent Fuel Pool cooling capability under anticipated malfunctions or failures can be obtained by boiling and use of makeup sources. No single makeup source is credited in the current licensing basis. There are several sources of makeup water; failure of any one source would not prevent other systems from satisfactorily providing emergency makeup water. This function does not meet the criteria listed in 10CFR 54.4(a)(1), (2) or (3).

Code SI-EQ Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
				X			

Comment: The SI System contains required components listed in the EQ Master List that are important to safety and are required to perform their safety related function when exposed to a worst case post accident environment.

Code SI-FP Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains associated circuits of concern related to the Fire Protection Safe Shutdown Decay Heat Removal function, contains required equipment that performs a Fire Protection Safe Shutdown RCS Inventory Control function and contains associated circuits of concern related to the Fire Protection Safe Shutdown RCS Inventory Control function.

Code SI-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The SI System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code SI-SB Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: PINGP systems which form part of the containment isolation boundary are in scope for License Renewal to support the SBO containment isolation functional requirement. In addition to the RC System, PINGP systems which form part of the reactor coolant pressure boundary during SBO events are in-scope for License Renewal to support the SBO primary system integrity safety objective.

USAR Reference

Additional SI System details are provided in Section 6.2, Section 6.2.2.1.1, Section 6.2.2.1.2, Section 6.2.2.2.3, Section 6.2.3.6, and Section 10.2.3.3.5 of the USAR.

License Renewal Drawings

The License Renewal drawings for the SI System are listed below:

Common	Unit 1	Unit 2
None	LR-XH-1-44	LR-XH-1001-6
	LR-XH-1-45	LR-XH-1001-7

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.2-3 along with each component's intended function(s).

Table 2.3.2-3 Safety Injection System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	HEAT TRANSFER PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY THROTTLE
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY THROTTLE

2.3.3 Auxiliary Systems

The following systems are addressed in this section:

- Auxiliary and Radwaste Area Ventilation System (Section 2.3.3.1)
- Chemical and Volume Control System (Section 2.3.3.2)
- Component Cooling System (Section 2.3.3.3)
- Containment Hydrogen Control System (Section 2.3.3.4)
- Control Room and Miscellaneous Area Ventilation System (Section 2.3.3.5)
- Cooling Water System (Section 2.3.3.6)
- Diesel Generator and Screenhouse Ventilation System (Section 2.3.3.7)
- Diesel Generators and Support System (Section 2.3.3.8)
- Fire Protection System (Section 2.3.3.9)
- Fuel Oil System (Section 2.3.3.10)
- Heating System (Section 2.3.3.11)
- Miscellaneous Gas System (Section 2.3.3.12)
- Plant Sample System (Section 2.3.3.13)
- Primary Containment Ventilation System (Section 2.3.3.14)
- Radiation Monitoring System (Section 2.3.3.15)
- Spent Fuel Pool Cooling System (Section 2.3.3.16)
- Station and Instrument Air System (Section 2.3.3.17)
- Steam Exclusion System (Section 2.3.3.18)
- Turbine and Administration Building Ventilation System (Section 2.3.3.19)
- Waste Disposal System (Section 2.3.3.20)
- Water Treatment System (Section 2.3.3.21)

2.3.3.1 Auxiliary and Radwaste Area Ventilation System

System Description

The Auxiliary and Radwaste Area Ventilation (ZA) System includes several sub-systems: The Auxiliary Building Special Ventilation sub-system is an auxiliary system designed to reliably collect significant portions of any potential containment system leakage that might bypass the Shield Building annulus or leakage from systems which could recirculate primary coolant during LOCA mitigation, and to cause it to pass through particulate, absolute, charcoal (PAC) filters before reaching the environment. Local ventilation is also provided to exhaust air through activated charcoal beds and high-efficiency filters from areas subject possible radioactive contamination. The ZA System also includes the Auxiliary Building Normal Ventilation, the Hot Lab/Sample Room Ventilation, Filter Room Ventilation, Laundry Room Exhaust and the Radwaste and Resin Disposal Building Ventilation sub-systems. Portions of the ZA System are a standby system and portions are an operating system.

The Auxiliary Building Special Ventilation sub-system is shared by Units 1 and 2. The Special Ventilation sub-system is provided with two redundant exhaust ducts, filters, heaters, fans and the necessary ducts, dampers and instrumentation designed to provide a sub-atmospheric pressure, ventilation and fission-product removal for the Auxiliary Building Category I Ventilation Zone. When the Auxiliary Building Special Ventilation sub-system is actuated, the normal supply and exhaust ducts for the Category I zone are closed automatically, and the normal supply and exhaust fans for the Auxiliary Building are tripped.

The Auxiliary Building Normal Ventilation sub-system for each PINGP Unit consists of two makeup air units, one exhaust fan and the necessary ducts, dampers and instrumentation designed to provide maximum safety and convenience for operating personnel with equipment arranged so that potentially contaminated areas are separated from clean areas. The system is balanced to maintain the Auxiliary Building at a pressure slightly negative with respect to atmospheric and adjacent Turbine Building pressures. In addition, the exhaust from the Laundry Room, Locker Room, Transport Area Toilet, Fuel Handling Toilet, Laundry Dryers, Monitor Tanks and Hot Machine Shop are considered part of the Auxiliary Building Normal Ventilation.

The Hot Lab/Sample Room Ventilation sub-system is shared by Units 1 and 2 and consists of a booster fan, two exhaust fans, filters and the necessary ducts, dampers and instrumentation designed to provide outside air and direct air from areas subject to possible contamination through charcoal absorber beds and high efficiency filters prior to release to the atmosphere. The Filter Room Ventilation sub-system is shared by Units 1 and 2 and consists of one exhaust fan, two filters and the necessary ducts, dampers and instrumentation designed to exhaust air from the Filter Rooms and waste gas storage areas through high efficiency filters prior to atmospheric release.

The Radwaste and Resin Disposal Building Ventilation is shared by Units 1 and 2 and consists of a makeup air handler, exhaust fan, filters and the necessary ducts, dampers and instrumentation designed to provide outside air and direct exhaust air from areas subject to possible radioactive contamination through activated charcoal beds and high efficiency filters. In addition, the drum station cement dust exhaust fan is considered part of the Radwaste and Resin Disposal Building Ventilation.

In areas where the ventilation system provides possible steam communication paths to the compartments designated as steam exclusion zones, redundant isolation dampers in the ventilation system automatically close in the event of a steam leak to isolate the desired envelopes; the portions of the ZA System that perform this Steam Exclusion Boundary function have been moved to the SE System for further evaluation. The ZA System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the ZA System support Environmental Qualification requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the ZA System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the ZA System containing components subject to an AMR begin at the Auxiliary Building Special Ventilation return ducts and extend to the shield building exhaust stacks and include the auxiliary building special exhaust fans, filters, ducts and dampers.

System Function Listing

A comprehensive listing of functions associated with the ZA System, or specific components contained in the system, is provided in the summary below.

Code ZA-01	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Auxiliary Building Special Ventilation sub-system provides the means to exhaust air from areas subject to possible radioactive contamination through activated charcoal beds and high efficiency filters.	X						

Comment: Collects significant portions of any potential containment system leakage that might bypass the Shield Building annulus or leakage from systems which could recirculate primary coolant during LOCA mitigation, and causes it to pass through charcoal filters before reaching the environment.

Code ZA-02 The Auxiliary Building Normal Ventilation sub-system is designed to provide maximum safety and convenience for operating personnel.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This sub-system includes the OCS/Records Room Supply/Exhaust, and other Auxiliary Building exhaust sub-systems. In addition, the make-up air units on Unit 2 have the capability of providing air for containment purge. When the Auxiliary Building Special Ventilation sub-system is actuated, the normal supply and exhaust ducts from the vent zone are closed automatically, and the normal supply and exhaust fans for the Auxiliary Building are tripped. These functions do not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code ZA-03 The Hot Lab/Sample Room Ventilation sub-system provides outside air and directs exhaust air from areas subject to possible radioactive contamination through activated charcoal beds and high efficiency filters.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code ZA-04 The Filter Room Ventilation sub-system exhausts air from the filter rooms and waste gas storage area through high efficiency filters.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code ZA-05 The Radwaste and Resin Disposal Building Ventilation sub-system provides outside air and directs exhaust air from areas subject to possible contamination through charcoal absorber beds and high efficiency filters.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code ZA-06 The Laundry Room Exhaust sub-system exhausts air from Access Control, Operations Support Center and the Shower Rooms.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code ZA-EQ Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
				X			

Comment: The ZA System contains required components listed in the EQ Master List that are important to safety and are required to perform their safety related function when exposed to a worst case post accident environment.

Code ZA-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The ZA System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

USAR Reference

Additional ZA System details are provided in Section 1.2.3, Section 1.3, Section 9.1.1, Section 10.3.2, Section 10.3.4, and Figure 10.3-6 of the USAR.

License Renewal Drawings

The License Renewal drawings for the ZA System are listed below:

Common	Unit 1	Unit 2
LR-39600	None	None

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-1 along with each component's intended function(s).

Table 2.3.3-1 Auxiliary and Radwaste Area Ventilation System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
DAMPER/HOUSINGS	PRESSURE BOUNDARY
DUCTING AND COMPONENTS	PRESSURE BOUNDARY
FAN HOUSINGS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
FLEX CONNECTIONS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY

Table 2.3.3-1 Auxiliary and Radwaste Area Ventilation System

Components	Intended Function
PIPING/FITTINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
SAMPLE POINTS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.2 Chemical and Volume Control System

System Description

The Chemical and Volume Control (VC) System is an auxiliary system that provides for boric acid injection, chemical additions for corrosion control, reactor coolant cleanup and degasification, reactor coolant makeup, reprocessing of water letdown from the RC System and reactor coolant pump seal water injection. The VC System also provides auxiliary pressurizer spray if normal pressurizer spray is not available. The VC System includes the Boron Recycle and Reactor Make-up sub-systems. The VC System is an operating system.

The VC System for each PINGP Unit consists of one volume control tank, three charging pumps, letdown and excess letdown heat exchangers, seal water heat exchanger, regenerative heat exchanger, letdown orifices, demineralizers, filters and the necessary piping, valves and instrumentation. During plant operation, reactor coolant flows through the letdown line and, after processing, is returned to the RC System cold leg via a charging line and through the in leakage in the reactor coolant pump seals. An excess letdown line is also provided for removing coolant from the RC System. Makeup water is provided from either the reactor makeup, boric acid, refueling water storage or chemical mixing tanks. Excess liquid effluents from the RC System are collected in holdup tanks prior to further processing for reuse or discharge.

The Boron Recycle sub-system is shared by Units 1 and 2. The sub-system consists of one batching tank, three boric acid storage tanks, two boric acid evaporators, transfer pumps and the necessary piping, valves and instrumentation. Boric acid is dissolved in hot water in the batching tank. A transfer pump is used to transfer the batch to the boric acid tanks. Small quantities of boric acid solution are metered from the discharge of an operating transfer pump for blending with reactor makeup water as makeup for normal leakage or for increasing the reactor coolant boron concentration during normal operation. Due to boron depletion, the gas stripper/boric acid evaporator packages are generally not utilized; water is processed as radioactive liquid waste.

The Reactor Make-up sub-system for each PINGP Unit consists of two storage tanks, two transfer pumps, a deoxygenation sub-system shared by Units 1 and 2, and the necessary piping, valves and instrumentation. The pumps take suction supply from the reactor makeup water tanks and provide demineralized water to the pressurizer relief tank, the boric acid blender and chemical mixing tank, to the spent fuel pool, makeup to the component cooling surge tank and to other plant components.

The VC System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the VC System support Environmental Qualification, Fire Protection and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the VC System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the VC System containing components subject to an AMR extend from the Volume Control Tank to the RC System, including containment isolation valves, pumps, heat exchangers, demineralizers, piping, and valves. The portions of the Boron Recycle sub-system containing components subject to an AMR extend from the batch tank, through the storage tanks to the charging pump supply. The portions of the Reactor Make-up sub-system containing components subject to an AMR extend from the storage tanks, through the deoxygenation system and pumps to the connections with the supported systems and components.

System Function Listing

A comprehensive listing of functions associated with the VC System, or specific components contained in the system, is provided in the summary below.

Code VC-01	Cri 1	Cri 2	Cri 3				
Add shutdown reactivity to the RC System by delivery of borated water.			FP	EQ	PTS	AT	SB

Comment: In the event that injection using the VC System is not available, the SI System can perform this function. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code VC-02 Adjust the concentration of chemical neutron absorber in the RC System for chemical reactivity control.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Normal reactivity shutdown capability is provided by control rods, the VC System provides boric acid injection used to compensate for the xenon transients, and for plant cooldown. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2), or (3).

Code VC-03 Contains SCs relied upon to perform a Primary Containment Boundary Function.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The VC System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code VC-04 Contains SCs that are part of the Reactor Coolant Pressure Boundary.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The VC System provides a boundary for containing the reactor coolant under operating temperature and pressure conditions. It serves to confine radioactive material and limits to acceptable values any release of radioactive material to the secondary system and to other parts of the plant under conditions of either normal or abnormal reactor operation.

Code VC-05 Provide the required seal water injection for the reactor coolant pump shaft seals.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The VC System provides the required seal water flow for the reactor coolant pump shaft seals. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2), or (3).

Code VC-06 The Reactor Make-up sub-system provides demineralized water to the VC system and other plant components.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Provides water to the VC System boric acid blender and chemical mixing tank for RC makeup; provides makeup water to the spent fuel pool and the component cooling surge tank; provides water to the pressurizer relief tank to cool the tank after discharge. Provides water to various VC and WD System components for pump seals and flushing; provides water to hose stations for use as needed. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code VC-07 Provide auxiliary pressurizer spray if normal pressurizer spray is not available during normal conditions and during and following a design basis accident.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Auxiliary spray is normally used for cooldown and depressurization of the pressurizer, but may also be used if normal pressurizer spray is inoperable. In the event that auxiliary spray using the VC System is not available, the pressurizer PORVs can perform this function. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code VC-08 Provide for corrosion control, reactor coolant cleanup and degasification, reactor coolant makeup, and reprocessing of water from the RC System.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The VC System provides a means for chemical additions for corrosion control, and reactor coolant cleanup and degasification. This system also adds makeup water to maintain the desired operating fluid inventory in the RC System, and reprocesses water letdown from the RC System. The system is also used to fill and hydrostatically test the RC System. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code VC-09 The Boron Recycle sub-system is used to prepare and store boric acid solution and provide reprocessing of water letdown from the RC System.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Due to boron depletion, reprocessing is generally not utilized; water is processed as radioactive liquid waste. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code VC-10 Provides a makeup source of water to the Spent Fuel Pool for alternate cooling capability.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Alternate Spent Fuel Pool cooling capability under anticipated malfunctions or failures can be obtained by boiling and use of makeup sources. No single makeup source is credited in the current licensing basis. There are several sources of makeup water; failure of any one source would not prevent other systems from satisfactorily providing emergency makeup water. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code VC-EQ	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: The VC System contains required components listed in the EQ Master List that are important to safety and are required to perform their safety related function when exposed to a worst case post accident environment.

Code VC-FP	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: The VC System contains associated circuits of concern related to the Fire Protection Safe Shutdown Decay Heat Removal function, contains required equipment that performs a Fire Protection Safe Shutdown RCS Inventory Control function, contains required equipment that performs a Fire Protection Safe Shutdown Reactivity Control function and contains associated circuits of concern related to the Fire Protection Safe Shutdown RCS Inventory Control function.

Code VC-NSAS	Cri 1	Cri 2	Cri 3				
Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The VC System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions, including HELB, that could cause failure of safety related components.

Code VC-SB	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.			FP	EQ	PTS	AT	SB
							X

Comment: The VC System establishes natural circulation necessary for core heat removal as part of SBO event coping by maintaining reactor coolant inventory. This includes isolation of the letdown, and makeup from the RWST to the charging pumps, including boric acid tank makeup from the boric acid transfer pumps. The portions of the VC System which form part of the containment isolation and RC System pressure boundary are in scope for License Renewal to support the SBO containment isolation functional requirement.

USAR Reference

Additional VC System details are provided in Section 4.4.2.2, Section 10.1, Section 10.2.3, and Section 14.5.4.5 of the USAR.

License Renewal Drawings

The License Renewal drawings for the VC System are listed below:

Common	Unit 1	Unit 2
LR-157545	LR-XH-1-38	LR-XH-1001-4
LR-39242	LR-XH-1-39	LR-XH-1001-5
LR-XH-1-40		
LR-XH-1-41		
LR-XH-1-405		
LR-XH-1001-128		

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-2 along with each component's intended function(s).

Table 2.3.3-2 Chemical and Volume Control System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
DEMINERALIZERS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
RUPTURE DISCS	PRESSURE BOUNDARY
SIGHT GLASSES	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.3 Component Cooling System

System Description

The Component Cooling (CC) System is an auxiliary system that is designed to provide heat removal from safeguards equipment associated with heat removal from the RC System during and following design basis events and provide heat removal from safeguards and non-safeguards equipment during normal conditions. The CC System is an operating system.

The CC System for each PINGP Unit consists of two heat exchangers, two pumps, surge tank and necessary piping, valves and instrumentation designed to provide two interconnected cooling loops. The loads are arranged so that each loop supplies a complete set of engineered safety features. The two cooling loops associated with one Unit are interconnected downstream from the heat exchangers so as to effectively form an open loop supply header both for loads which are essential (safeguards) and those that are nonessential (non-safeguards). The loops are separated from each other and some of the nonessential loads are isolated by the Safety Injection signal. A single surge tank is provided for each Unit to accommodate the expansion and contraction of the component cooling water to assure a continuous supply of component cooling water and ensure adequate net positive suction head for the CC pumps. Makeup water is taken from the reactor makeup tanks or demineralized water plant supply. The Unit 1 and Unit 2 CC Systems communicate via an expansion line connecting the surge tanks of each Unit.

The CC System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the CC System support Fire Protection and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the CC System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the CC System containing components subject to an AMR is a closed loop system, consisting of heat exchangers, pumps, surge tank, piping and valves.

System Function Listing

A comprehensive listing of functions associated with the CC System, or specific components contained in the system, is provided in the summary below.

Code CC-01	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Provide heat removal from safeguards equipment associated with heat removal from the RC System during and following design basis events.	X						

Comment: The CC System removes heat from the RH, CS and SI pumps, RH heat exchangers, and RCP thermal barrier and provides an intermediate cooling system between the heat exchangers in the potentially radioactive systems and the CL System.

Code CC-02	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Provide heat removal from safeguards and non-safeguards equipment during normal conditions.							

Comment: The CC System provides heat removal from various RC, RH, SM, VC and WD System components during normal conditions and provides an intermediate cooling system between the heat exchangers in the potentially radioactive systems and the CL System. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CC-03	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Contains SCs relied upon to perform a Primary Containment Boundary Function.	X						

Comment: The CC System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code CC-FP	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			X				

Comment: This system contains required equipment that performs a Fire Protection Safe Shutdown RCS Inventory Control function and a Fire Protection Safe Shutdown Support Equipment function.

Code CC-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The CC System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code CC-SB Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: The CC System supports primary system integrity for coping with the SBO event by providing cooling water to the reactor coolant pump seals to minimize seal leakage. Closed loop portions of the CC System whose pressure boundary is required to support this function are in scope of License Renewal. Portions of the CC System which form part of the containment isolation boundary are in scope for License Renewal to support the SBO containment isolation functional requirement.

USAR Reference

Additional CC System details are provided in Section 10.4.2 of the USAR.

License Renewal Drawings

The License Renewal drawings for the CC System are listed below:

Common	Unit 1	Unit 2
None	LR-39245-1 LR-39245-2	LR-39246-1 LR-39246-2

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-3 along with each component's intended function(s).

Table 2.3.3-3 Component Cooling System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
FLEX CONNECTIONS	PRESSURE BOUNDARY
FLOW ELEMENTS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY

Table 2.3.3-3 Component Cooling System

Components	Intended Function
HEAT EXCHANGER TUBES	HEAT TRANSFER PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
SIGHT GLASSES	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.4 Containment Hydrogen Control System

System Description

The Containment Hydrogen Control (HC) System is an auxiliary system that is designed to provide a sampling path from the primary containment to a hydrogen analyzer and provide a method to reduce the containment pressure during normal conditions. License Amendments 163/154 eliminated requirements for a hydrogen control function. The HC System is a standby system.

The HC System for each PINGP Unit consists of two independent paths, including necessary piping, valves and instrumentation, designed to provide a small flow of containment gases to a hydrogen analyzer or to the Shield Building from the ducting of the containment dome vent fans. Each PINGP Unit also has two electric hydrogen recombiners; License Amendments 163/154 eliminated requirements for the hydrogen recombiners, although they remain installed. Portions of the piping perform a Primary Containment Boundary Function.

The HC System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the HC System support Environmental Qualification and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the HC System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the HC System containing components subject to an AMR are those piping components that support the Primary Containment Boundary Function.

System Function Listing

A comprehensive listing of functions associated with the HC System, or specific components contained in the system, is provided in the summary below.

Code HC-01 Provide sampling lines for hydrogen monitors.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: A small flow of containment gases can be directed to a hydrogen analyzer providing reliable indication of the hydrogen concentrations in the containment. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code HC-02 Control positive pressure within the containment vessel.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The HC System may be used to reduce the containment pressure prior to placing the Containment Purge or Containment In-Service Purge sub-systems in use or when Containment Vessel pressure requires. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code HC-03 Contains SCs relied upon to perform a Primary Containment Boundary Function.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The HC System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code HC-EQ Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
				X			

Comment: The HC System contains required components listed in the EQ Master List that are important to safety and are required to perform their safety related function when exposed to a worst case post accident environment.

Code HC-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The HC System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code HC-SB Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: The portions of the HC System which form part of the containment isolation boundary are in scope for License Renewal to support the SBO containment isolation functional requirement.

USAR Reference

Additional HC System details are provided in Section 5.4.2 of the USAR, and License Amendment 164/153.

License Renewal Drawings

The License Renewal drawings for the HC System are listed below:

Common	Unit 1	Unit 2
LR-39251	None	None

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-4 along with each component's intended function(s).

Table 2.3.3-4 Containment Hydrogen Control System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.5 Control Room and Miscellaneous Area Ventilation System

System Description

The Control Room and Miscellaneous Area Ventilation (ZN) System is an auxiliary system designed to provide a reliable means of cooling and filtering air supplied to the Control Room under both normal conditions and during and following design basis events, and includes the Control Room Breathing Air sub-system. The ZN System also includes the Safeguards Chilled Water and the Lab and Service Area Air Conditioning and Chilled Water sub-systems designed to remove heat from safeguards and non-safeguards areas, the Battery Room Special Exhaust Ventilation sub-system designed to prevent the buildup of a combustible concentration of hydrogen gas in the battery rooms and the Service and Computer Ventilation sub-system designed to provide heat removal from the Service Building and the computer room. The ZN System and sub-systems are operating systems.

The ZN System is shared by Units 1 and 2 and consists of two ventilation trains each consisting of an air handler, filters, cooling coils, clean-up fan and the necessary ducts, dampers and instrumentation. The system is designed to maintain the control room at a suitable temperature condition for personnel habitability and equipment operability and to isolate the outside atmosphere and re-circulate a portion of the control room atmosphere through PAC filters to maintain the dose to the control room operators less than requirements. Protection from toxic chemicals is provided by detection (smell) and the ability to don self contained breathing apparatus (SCBA). The Control Room Breathing Air sub-system is shared by Units 1 and 2 and consists of three banks of high pressure air cylinders and the necessary piping, valves and instrumentation designed for refilling the SCBA.

The Safeguards Chilled Water sub-system is shared by Units 1 and 2 and consists of two trains each consisting of one water cooled chiller package (centrifugal compressor, evaporator, water-cooled condenser, and economizer with expansion tube), surge tank, air separator, strainer, pump, coils, unit coolers and the necessary piping, valves and instrumentation. The system is designed to work with the control room ventilation system and local unit coolers to remove heat from the control room, safeguards switchgear rooms, residual heat removal pump pits, relay room, including the old plant process computer room, and the event monitoring equipment room.

The Non-Safeguards Lab and Service Area Air Conditioning and Chilled Water sub-system is shared by Units 1 and 2 and consists of one water cooled chiller package (centrifugal compressor, evaporator, water-cooled condenser, and economizer with expansion tube), surge tank, air separator, strainer, pump, coils, unit coolers and the necessary piping, valves and instrumentation. The system is designed to remove heat from the Administration Building, cold chemistry lab, access control, hot chemistry lab, control rod drive rooms and other various non-safeguards locations throughout the plant.

The Battery Room Special Exhaust Ventilation sub-system is shared by Units 1 and 2 and consists of two trains of exhaust fans, and the necessary ducts, dampers and instrumentation designed to provide exhaust flow from the safeguards battery rooms to prevent the buildup of a combustible concentration of hydrogen gas in the battery rooms.

The Service and Computer Ventilation sub-system is shared by Units 1 and 2 and consists of ventilation fans, air conditioning units, glycol cooling loops, exhaust fans and the necessary ducts, dampers and instrumentation designed to provide tempered and filtered air and remove exhaust air from the Service Building to ensure a suitable working environment for personnel and equipment. The Service and Computer Ventilation sub-system is divided into four sub-systems: Computer Room Ventilation, Programmers Area Ventilation, Battery Room Ventilation, and Inverter and Load Center Ventilation

In areas where the ventilation system provides possible steam communication paths to the compartments designated as steam exclusion zones, redundant isolation dampers in the ventilation system automatically close to isolate the desired envelopes; the portions of the ZN System that perform this Steam Exclusion Boundary function have been moved to the SE System for further evaluation. The ZN System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the ZN System support Environmental Qualification, Fire Protection, and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the ZN System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portion of the ZN System containing components subject to an AMR begins at the air supply and recirculation ducts to/from the control room, computer room and relay room and includes air handlers, filters, cooling coils, unit coolers, clean-up fan, the necessary ducts & dampers and the breathing air sub-systems air bottles/packs, valves, piping (hoses) & instrumentation. The portions of the Safeguards Chilled Water and Lab and Service Area Air Conditioners and Chilled Water sub-systems containing components subject to an AMR include the closed loop chilled water systems including chiller components, cooling coils, tanks, strainers and the necessary piping and valves. The portion of the Battery Room Special Exhaust Ventilation sub-system containing components subject to an AMR begins as the air duct exits the battery rooms and extends to the exhaust duct discharge and includes the fan, ducts and dampers. The portion of the Service and Computer Ventilation sub-system containing components subject to an AMR is the supply and return glycol piping headers between the glycol pumps, coolers and expansion tank located in the Turbine Building.

System Function Listing

A comprehensive listing of functions associated with the ZN System, or specific components contained in the system, is provided in the summary below.

Code ZN-01	Cri 1	Cri 2	Cri 3				
The ZN System is designed to provide a reliable means of cooling and filtering air supplied to the Control Room under both normal and during and following design basis events.			FP	EQ	PTS	AT	SB
	X						

Comment: This function includes providing a habitable environment for operating personnel.

Code ZN-02	Cri 1	Cri 2	Cri 3				
The Battery Room Special Ventilation sub-system provides exhaust flow from the Battery Rooms to prevent the buildup of a combustible concentration of hydrogen gas in the battery rooms.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code ZN-03	Cri 1	Cri 2	Cri 3				
The Safeguards Chilled Water sub-system removes heat generated by safety related equipment.			FP	EQ	PTS	AT	SB
	X						

Comment: The Safeguards Chilled Water sub-system circulates chilled water to provide ambient air cooling to essential areas including the control room, safeguards switchgear rooms, the residual heat removal pump pits, relay room and the event monitoring equipment rooms.

Code ZN-04	Cri 1	Cri 2	Cri 3				
The Control Room Breathing Air sub-system provides protective breathing equipment to the control room operators for postulated toxic chemical releases.			FP	EQ	PTS	AT	SB
		X					

Comment: Self contained breathing apparatus and air cylinder banks for refilling are provided for the Control Room operating staff.

Code ZN-05	Cri 1	Cri 2	Cri 3				
The Lab and Service Area Air Conditioning and Chilled Water sub-system removes heat as necessary from various locations throughout the plant to make the locations compatible for personnel and equipment.			FP	EQ	PTS	AT	SB

Comment: This is a non-safeguards, closed system supplying the Administration Building air handler and various unit coolers in the Lab and Service Areas. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code ZN-06	Cri 1	Cri 2	Cri 3				
The Service and Computer Ventilation sub-system provides tempered air and removes exhaust air to provide a suitable working environment and maintain temperatures required by machinery.			FP	EQ	PTS	AT	SB

Comment: Provides heating, ventilation and air conditioning to the Service Building spaces. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code ZN-EQ	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: The system contains required components listed in the EQ Master List that are important to safety and are required to perform their safety related function when exposed to a worst case post accident environment.

Code ZN-FP	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains required equipment that performs a Fire Protection Safe Shutdown Support Equipment function.

Code ZN-NSAS	Cri 1	Cri 2	Cri 3				
Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The ZN System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code ZN-SB	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.							X

Comment: Provides cooling and ventilation for the control room, computer room, and relay room, and safeguard switchgear rooms which contain equipment relied upon for coping and mitigation of the SBO event.

USAR Reference

Additional ZN System details are provided in Section 2.9.4, Section 8.5.6, Section 10.3.3.2, Section 10.4.3, Figure 10.3-9, and Table 1.3-2 of the USAR.

License Renewal Drawings

The License Renewal drawings for the ZN System are listed below:

Common	Unit 1	Unit 2
LR-39603-1	None	None
LR-39603-3		
LR-39603-4		
LR-93013		

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-5 along with each component's intended function(s).

Table 2.3.3-5 Control Room and Miscellaneous Area Ventilation System

Components	Intended Function
AIR REGULATORS	PRESSURE BOUNDARY
BOLTING/FASTENERS	PRESSURE BOUNDARY
CHILLER COMPONENTS	PRESSURE BOUNDARY
DAMPER/HOUSINGS	PRESSURE BOUNDARY
DUCTING AND COMPONENTS	PRESSURE BOUNDARY
FAN HOUSINGS	PRESSURE BOUNDARY
FILTER/STRAINER ELEMENTS	FILTER
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
FLEX CONNECTIONS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	HEAT TRANSFER PRESSURE BOUNDARY

Table 2.3.3-5 Control Room and Miscellaneous Area Ventilation System

Components	Intended Function
HUMIDIFIERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RUPTURE DISCS	PRESSURE BOUNDARY
SAMPLE POINTS	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.6 **Cooling Water System**

System Description

The Cooling Water (CL) System is an auxiliary system that is designed to provide a water supply to the Auxiliary Feedwater pumps for RC System heat removal and provides a water supply for safeguards and non-safeguards equipment heat loads during normal conditions and during and following design basis events. The CL System also provides normal or backup source of water to various plant equipment, including the fire protection headers. The CL System includes the Filtered Water, Hypobromus Acid Feed, Equipment Heat Removal and the Containment and Auxiliary Building Cooling sub-systems. The CL System is an operating system.

The CL System is shared by Units 1 and 2. The CL System consists of five pumps feeding a ring header which distributes cooling water throughout the plant and includes filters, heat exchangers, chillers, cooling coils and the necessary piping, valves and instrumentation. Normal operation utilizes two non-safeguards horizontal pumps, with a safeguards vertical motor-driven pump as a standby. The safeguards vertical motor-driven pump can be used in addition to the two non-safeguards horizontal pumps. Two safeguards vertical diesel driven pumps are provided for emergency operation. The safeguards vertical motor-driven pump can also be aligned as a replacement for one of the safeguards vertical diesel driven cooling water pumps. The Mississippi River is the source of cooling water. The cooling water pumps normally are supplied from behind the circulating water traveling screens. An alternate source of water is provided for the safeguards vertical pumps using an Emergency

Cooling Water Intake pipe. This alternate source of water is drawing through a canal which communicates with the river so that if the normal intake canal becomes obstructed, a source of water will always be available for the pumps. There are two cooling water strainers in each cooling water header. Backwash valves on each strainer provide for the clearing of debris from the strainers to prevent loss of flow due to debris build up. The return side of the CL System disposes of the water to the circulating water conduits. Each return header is equipped with a standpipe that has a dump to grade connection that allows water to continue to flow through the header in the event that the normal discharge line is blocked. In the event that the standpipes cannot perform this function, there is an emergency dump to grade that can be used by the manipulation of a few valves. Seal water is provided to the safeguards and the non-safeguards cooling water pumps from a well water sub-system. The safeguards cooling water pumps have the capability to supply their own backup seal water supply while the non-safeguards cooling water pumps receive their backup seal water supply from the Filtered Water sub-system supplied from the CL header.

The Filtered Water sub-system provides component bearing/gland seal cooling and component priming to the CL and FP pumps. The Hypobromous Acid Feed sub-system provides chemicals to the CL System to inhibit/delay microbiological induced corrosion. The Equipment Heat Removal sub-system removes the heat generated by various pumps and air compressor motors as well as selected areas of the plant. Various heat-up studies have determined these unit coolers are not required to maintain any equipment operability. The Containment and Auxiliary Building Cooling sub-system provides chilled water to the containment air cooling fan coil units and the control rod drive mechanism shroud cooling coils, as well as for the unit coolers located within the Auxiliary Building, during normal plant operation. During accident conditions, the system returns to its original design integrity and configuration by isolating the chilled water sub-system and supplying the affected components from the main CL header.

The CL System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the CL System support Environmental Qualification, Fire Protection and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the CL System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the CL System containing components subject to an AMR begin at the Mississippi River and include the Emergency Cooling Water Intake pipe, extending through the pumps, strainers, various equipment and heat exchangers, including the Equipment Heat Removal and Containment and Auxiliary Building Cooling sub-system, to the CL System discharge standpipe and includes piping, valves, pumps, filters, heat exchangers and coolers. The portion of the Hypobromous Acid Feed sub-system containing components subject to AMR begins as the piping enters the Screenhouse wall and extends to the suction of the horizontal cooling water pump.

System Function Listing

A comprehensive listing of functions associated with the CL System, or specific components contained in the system, is provided in the summary below.

Code CL-01	Cri 1	Cri 2	Cri 3				
Provide a water supply for safeguards equipment heat loads during normal conditions and during and following design basis events.			FP	EQ	PTS	AT	SB
	X						

Comment: Cooling water provides heat removal for the CL System, Safeguards Chilled Water sub-system, Containment Air Cooling sub-system, diesel-driven cooling water pumps and the Unit 1 diesel generators during normal conditions and during and following design basis events.

Code CL-02	Cri 1	Cri 2	Cri 3				
Provide a water source or backup water source to various safeguards equipment during normal and accident conditions.			FP	EQ	PTS	AT	SB
	X						

Comment: Cooling water supplies wash water to the safeguards traveling screens in the emergency pump bay and the water to the Fire Protection Deluge System installed in each filter assembly in the Shield Building and Auxiliary Building Special Ventilations sub-systems. Cooling water also provides a backup water source to the Filtered Water sub-system.

Code CL-03	Cri 1	Cri 2	Cri 3				
Provide a water supply to the auxiliary feedwater pumps for RC System heat removal during normal and accident conditions.			FP	EQ	PTS	AT	SB
	X						

Comment: Cooling water is provided to the steam generators to remove residual heat from the RC System, prevent thermal cycles of the steam generator tube sheet and maintain a head of water in the steam generators.

Code CL-04 Contains SCs relied upon to perform a Primary Containment Boundary Function.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The CL System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code CL-05 Provides isolation from the Auxiliary Building and Containment Chilled Water sub-system.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: To provide isolation of the Auxiliary Building and Containment Chilled Water sub-system to the containment fan coil units so that cooling water is supplied to the fan coil units when required.

Code CL-06 Provides a water supply for non-safeguards equipment heat loads during normal conditions.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Cooling water provides heat removal for the SA, SB and TB Systems and other non-safeguards equipment heat loads during normal conditions. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CL-07 Provide a water source or backup water source to various non-safeguards equipment during normal conditions.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Cooling water supplies the Hypobromous, Equipment Heat Removal and the Auxiliary Building and Containment Chilled Water sub-systems. Cooling water also provides a backup fire protection water source to the FP System during abnormal conditions. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CL-08 Provides a flow path to the river for Turbine and Auxiliary Building roof drains and the dumping of condensate.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CL-09 The Hypobromous Acid Feed sub-system provides chemicals to the CL System to inhibit/delay microbiological induced corrosion.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CL-10 The Auxiliary Building and Containment Chilled Water sub-system provides chilled water during normal plant operation for normal plant equipment heat loads.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Supplies chilled water to the containment fan coil units and the control rod drive mechanism shroud cooling coils, as well as for the unit coolers located within the Auxiliary Building. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CL-11 The Equipment Heat Removal sub-system removes the heat generated by various pump and air compressor motors as well as selected areas of the plant.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Various heat-up studies have determined the Equipment Heat Removal unit coolers are not required to maintain any equipment operability. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CL-12 The Filtered Water sub-system provides bearing/gland seal cooling water and pump priming to CL, CW and FP pumps.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The Filtered Water sub-system is normally supplied from a well water or filtered water pump with a backup supply provided from the Cooling Water header. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CL-EQ Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
				X			

Comment: The CL System contains required components listed in the EQ Master List that are important to safety and are required to perform their safety related function when exposed to a worst case post accident environment.

Code CL-FP Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains required equipment that performs a Fire Protection Safe Shutdown Support Equipment function.

Code CL-NSAS	Cri 1	Cri 2	Cri 3				
Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The CL System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions, including flooding, that could cause failure of safety related components.

Code CL-SB	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.			FP	EQ	PTS	AT	SB
							X

Comment: The CL System provides cooling water to a number of systems credited for SBO event coping, including containment heat removal, Emergency Diesel Generator heat removal, CC System heat removal, and SA System air compressors. Portions of the CL System necessary to ensure adequate heat transfer is provided to SBO loads are in scope for License Renewal.

The portion of the CL System which form part of the containment isolation boundary are in scope for License Renewal to support the SBO containment isolation functional requirement.

USAR Reference

Additional CL System details are provided in Section 1.3.9, Section 6.2.2.1.3, Section 10.1, Section 10.3.1.2.1, and Section 10.4.1 of the USAR.

License Renewal Drawings

The License Renewal drawings for the CL System are listed below:

<u>Common</u>	<u>Unit 1</u>	<u>Unit 2</u>
LR-39216-1	LR-39216-2	LR-39217-1
LR-39254	LR-39216-3	LR-39217-2
LR-39603-2	LR-39216-4	LR-39217-3
LR-86172-1		
LR-86172-3		
LR-86172-4		

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-6 along with each component’s intended function(s).

Table 2.3.3-6 Cooling Water System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
CHILLERS COMPONENTS	PRESSURE BOUNDARY
FILTER/STRAINER ELEMENTS	FILTER
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
FLEX CONNECTIONS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	HEAT TRANSFER PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY THROTTLE
SIGHT GLASSES	PRESSURE BOUNDARY
SPRAY NOZZLES	SPRAY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.7 Diesel Generator and Screenhouse Ventilation System

System Description

The Diesel Generator and Screenhouse Ventilation (ZG) System is an auxiliary system that consists of the D1/D2 Diesel Generator Room Ventilation, D5/D6 Building HVAC and the Screenhouse Ventilation sub-systems designed to limit ambient temperature within equipment ratings when the associated diesel generators are operating. Portions of these sub-systems are also designed to provide air and remove exhaust air to provide a suitable working environment, prevent the build-up of flammable atmosphere in certain rooms and maintain temperatures required by machinery during normal plant operation. Portions of the ZG System are a standby system and portions are an operating system.

The D1/D2 Diesel Generator Ventilation sub-system for PINGP Unit 1 consists of ventilation fans, exhaust fans and the necessary ducts, dampers and instrumentation designed to provide the diesel generator room with a supply of outside air to maintain air temperature within operational limits and exhaust air to remove heat generated by the diesel generators. The D5/D6 Building HVAC sub-system for PINGP Unit 2 consists of ventilation fans, exhaust fans, air conditioning units and the necessary ducts, dampers and instrumentation designed to provide ventilation of the D5/D6 Building and maintain ambient room temperature so the diesel generators and support sub-systems will operate within their functional temperature limits. Portions of D5/D6 Building HVAC sub-system also provide ventilation and exhaust during normal plant operation to provide suitable working environment for personnel and equipment.

The Screenhouse Ventilation sub-system is shared by Units 1 and 2 and consists of ventilation fans, exhaust fans and the necessary ducts, dampers and instrumentation designed to maintain the Screenhouse safeguards area temperature to support the operation of safety related diesel driven cooling water pumps and 121 motor driven cooling water pump. Portions of the Screenhouse Ventilation sub-system also provide ventilation and exhaust during normal plant operation to provide a suitable working environment for personnel and equipment.

The ZG System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the ZG System support Fire Protection and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the ZG System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the D1/D2 Diesel Generator Ventilation sub-system containing components subject to an AMR begin at the Diesel Generator Rooms inlet damper, through the supply fans, and exits via exhaust fans and include the dampers, fans and duct. The portions of the D5/D6 Building HVAC sub-system containing components subject to an AMR begin at the Diesel Generator Rooms and D5/D6 Building outside and return inlet dampers, through the cooling fans and exits through the exhaust dampers and include dampers, fans and duct. The portions of the Screenhouse Ventilation sub-system containing components subject to an AMR are two inlet dampers, two exhaust fans and two exhaust dampers.

System Function Listing

A comprehensive listing of functions associated with the ZG System, or specific components contained in the system, is provided in the summary below.

Code ZG-01 The D1/D2 Diesel Generator Room Ventilation sub-system is designed to limit ambient temperature within the Diesel Generator Rooms to equipment ratings when the diesel generators are operating.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: None

Code ZG-02 The Screenhouse Ventilation sub-system is designed to limit ambient temperature within the Diesel Driven Cooling Water and 121 Cooling Water pump rooms to equipment ratings when the diesel generators are operating.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The safety related portions of the Screenhouse Ventilation sub-system include the Screenhouse safeguards exhaust fan and scavenging air dampers.

Code ZG-03 The Screenhouse Ventilation sub-system provides air and removes exhaust air to provide a suitable working environment and maintain temperatures required by machinery during normal plant operation.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The non-safety related portions of the Screenhouse Ventilation sub-system include the Screenhouse exhaust and circ water pump fans. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code ZG-04 The D5/D6 Building HVAC sub-system is designed to limit ambient temperature within the equipment ratings when the diesel generators are operating and provide sufficient air flow to prevent the build-up of unwanted gases.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The safety related portions of the D5/D6 Building HVAC include the Diesel Generator Engine Room Ventilation, Emergency Switchgear Areas Ventilation and Diesel Generator Control Room and Switchgear Area Ventilation sub-systems.

Code ZG-05	Cri 1	Cri 2	Cri 3				
The D5/D6 Building HVAC sub-system provides air and removes exhaust air to provide a suitable working environment, prevent the build-up of flammable atmosphere in certain rooms and maintain temperatures required by machinery during normal plant operation.			FP	EQ	PTS	AT	SB

Comment: The non-safety related portions of the D5/D6 Building HVAC sub-system include non-safety related Diesel Generator Engine Room Ventilation, Lube Oil Storage Tank and Fuel Oil Day Tank Exhaust and the Control Room and Switchgear Area Auxiliary Cooling sub-systems. Portions of the safety related Building Ventilation sub-system are also normally operated to support this function. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code ZG-FP	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains required equipment that performs a Fire Protection Safe Shutdown Support Equipment function.

Code ZG-NSAS	Cri 1	Cri 2	Cri 3				
Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The ZG System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code ZG-SB	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.			FP	EQ	PTS	AT	SB
							X

Comment: Provides cooling and ventilation for the emergency diesel generator rooms (for D1, D2, D5, and D6) and for the CL System pumps area in the Screenhouse. The DG and CL Systems are relied upon for coping with the SBO event.

USAR Reference

Additional ZG System details are provided in Section 8.4.1, Section 8.4.2, Section 10.3.12.1, Figure 10.3-7, and Figure 10.3-11 of the USAR.

License Renewal Drawings

The License Renewal drawings for the ZG System are listed below:

Common	Unit 1	Unit 2
LR-39601	None	LR-118254
LR-39603-1		LR-118255

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-7 along with each component's intended function(s).

Table 2.3.3-7 Diesel Generator and Screenhouse Ventilation System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
DAMPER/HOUSINGS	PRESSURE BOUNDARY
DUCTING AND COMPONENTS	PRESSURE BOUNDARY
FAN HOUSINGS	PRESSURE BOUNDARY
FLEX CONNECTIONS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY

2.3.3.8 Diesel Generators and Support System

System Description

The Diesel Generator and Support (DG) System is an auxiliary system that is designed to provide backup power to safety related, non-safety related and security equipment. In addition, the system includes diesel motors that provide the motive force for the cooling water pumps. The DG System includes the safety related diesel generators, non-safety related diesel generators, guardhouse diesel generator and cooling water diesel driven pumps. The DG System is a standby system.

The safety related diesel generators for each PINGP Unit consist of two diesel generators, including Starting Air, Lube Oil, Combustion Air, Exhaust Air, Engine Cooling and Fuel Oil sub-systems, and the necessary piping, valves and instrumentation. The engines are air start and cooled by cooling water (CL) or radiators. Each safety related diesel generator is capable of sequentially starting and supplying the power requirements of one of the redundant sets of engineered safety features for its reactor Unit. In addition, in the event of a station blackout (SBO) condition, each diesel generator is capable of sequentially starting and supplying the power requirements of the hot shutdown loads for its Unit, as well as the essential loads of the blacked out Unit. To ensure rapid start, each diesel generator is equipped with electric heaters which furnish heat to the engine cooling water and engine lubricating oil when the engine is shut down. Motor driven circulating pumps for cooling water and lube oil operate continuously when the engines are shut down.

The non-safety related diesel generators are shared by Units 1 and 2 and consist of two diesel generators, including Lube Oil, Combustion Air, Exhaust Air, Engine Cooling and Fuel Oil sub-systems, and the necessary piping, valves and instrumentation. The engines are battery start and radiator cooled. The non-safety related diesel generators provide backup to a variety of non-safeguards loads including plant process computers uninterruptible power supplies, non-safeguards station battery chargers and turbine generator AC auxiliaries. The non-safety related diesel generators are normally in standby with the coolant and lube oil partially heated with a Keep-Warm sub-system.

The guardhouse diesel generator is shared by Units 1 and 2 and consists of a skid mounted diesel generator, fuel oil sub-system, and the necessary piping, valves and instrumentation. The engine is battery start and radiator cooled. The guardhouse diesel is designed to provide emergency electrical power to supply the plant security systems. The diesel is normally in standby with the Keep-Warm sub-system in operation.

The cooling water diesel driven pumps are shared by Units 1 and 2 and consist of two diesel driven pumps, including starting air, lube oil, combustion air, exhaust air, engine cooling and fuel oil sub-systems, and the necessary piping, valves and instrumentation. The engines are air start and cooled by cooling water (CL). The diesel motors provide the motive force to provide cooling water flow to support the safety related functions of the CL System. The Diesel Driven Pumps are used whenever an engineered safety features sequence is initiated, when discharge header pressure drops below its setpoint, or on a loss of offsite power. The diesels are normally in standby with a Keep-Warm sub-system in operation.

The DG System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the DG System support Fire

Protection and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the DG System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the safety related diesel generators and diesel driven cooling water pumps containing components subject to an AMR include the Motor, Starting Air, Lube Oil, Combustion Air, Exhaust Air, Engine Cooling and Fuel Oil sub-systems, and include the tanks, piping, heaters, heat exchangers and valves. The non-safety related diesel generators and guardhouse diesel generator are not within scope of License Renewal.

System Function Listing

A comprehensive listing of functions associated with the DG System, or specific components contained in the system, is provided in the summary below.

Code DG-01	Cri 1	Cri 2	Cri 3				
The Safety Related Diesel Generators (D1, D2, D5 & D6) provide backup power to serve safeguards equipment in the event of a design basis accident concurrent with loss of offsite power.			FP	EQ	PTS	AT	SB
	X						

Comment: Each generator has adequate capacity to supply the engineered safety features for the design basis accident in one Unit, or to allow the Unit to be placed in a safe shutdown condition in the event of loss of outside electrical power.

Code DG-02	Cri 1	Cri 2	Cri 3				
The Safety Related Diesel Generators (D1, D2, D5 & D6) provide backup power to serve non-safeguards equipment to permit orderly shutdown.			FP	EQ	PTS	AT	SB

Comment: Supplies power to equipment that is not essential for plant safety, however, for non-safeguards reasons, it is desirable to maintain power. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code DG-03	Cri 1	Cri 2	Cri 3				
The Cooling Water Pump Diesels provide backup cooling water flow for emergency operation.			FP	EQ	PTS	AT	SB
	X						

Comment: The Diesel Driven Pumps are used whenever an engineered safety features sequence is initiated, when discharge header pressure drops below its setpoint, or on a loss of offsite power.

Code DG-04 The Guardhouse Diesel Generator provides backup power to serve the plant security equipment.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code DG-05 The Non-safety Related Diesel Generators (D3 & D4) provide backup power to serve a variety of non-safeguards loads including plant process computers, non-safeguards station battery chargers and turbine generator auxiliaries.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code DG-FP Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains required equipment that performs a Fire Protection Safe Shutdown Support Equipment function.

Code DG-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The DG System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code DG-SB Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: Essential to SBO classification as an alternate AC plant and 4 hour coping duration. Provides emergency power to equipment essential to core heat removal, primary system integrity (i.e., RC pump seal cooling), secondary side heat removal, and process monitoring.

USAR Reference

Additional DG System details are provided in Section 8.4.1, Section 8.4.2, Section 8.4.5, Section 10.4.1.2, Table 8.4-3, and Table 8.4-4 of the USAR.

License Renewal Drawings

The License Renewal drawings for the DG System are listed below

Common	Unit 1	Unit 2
None	LR-39255-1	LR-118240
		LR-118241
		LR-118242
		LR-118243
		LR-118244
		LR-118245
		LR-118246
		LR-118247
		LR-118248
		LR-118249
		LR-118250
		LR-118251

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-8 along with each component's intended function(s).

Table 2.3.3-8 Diesel Generators and Support System

Components	Intended Function
AIR REGULATORS	PRESSURE BOUNDARY
BOLTING/FASTENERS	PRESSURE BOUNDARY
FILTER/STRAINER ELEMENTS	FILTER
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
FLEX CONNECTIONS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	HEAT TRANSFER PRESSURE BOUNDARY
HEATERS	PRESSURE BOUNDARY
LEVEL GAGES	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
MUFFLERS	PRESSURE BOUNDARY
OIL PANS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
SIGHT GLASSES	PRESSURE BOUNDARY
SILENCERS	PRESSURE BOUNDARY

Table 2.3.3-8 Diesel Generators and Support System

Components	Intended Function
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
TURBOCHARGERS	HEAT TRANSFER PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.9 Fire Protection System

System Description

The Fire Protection (FP) System is an auxiliary system designed to provide reasonable assurance, through defense-in-depth, that a fire will not prevent the performance of necessary safe shutdown functions and that radioactive releases to the environment in the event of a fire will be minimized. The FP System utilizes water spray, Cardox, Halon, hose lines and sprinklers to combat fire. Portable extinguishers are also provided extensively throughout the plant. The FP System includes the Reactor Coolant Pump (RCP) Lube Oil Collection, Fire Water, Halon, Carbon Dioxide and Fire Detection sub-systems. The FP System is a standby system.

The FP System is shared by Units 1 and 2. The Fire Water sub-system consists of two dedicated fire pumps, one motor-driven and one diesel-driven, filters and the necessary piping, valves and instrumentation. A pump normally assigned to the Screen Wash sub-system serves as a backup to the fire header. Pressurization of the Fire Water sub-system is maintained by a jockey pump. Water for the system is from the Mississippi River through the intake canal. The CL System provides a backup source of water to the Fire Water sub-system through normally closed manual valves. Deluge water is supplied to the filter assemblies in the Shield Building Ventilation sub-system and Auxiliary Building Special Ventilation sub-system from either the Fire Water sub-system or the CL System. The Fire Water sub-system provides a backup water supply to the instrument air compressors after-coolers and the Screen Wash sub-system.

The Carbon Dioxide sub-system consists of a tank, refrigerant compressor and necessary piping, valves and instrumentation, designed to provide a total flood capability for the Relay/Computer Room. The Halon sub-system consists of various cylinders and necessary piping, valves and instrumentation, designed to protect the Security Building computer room, records vault and Service

Building Addition computer room. The RCP Lube Oil Collection sub-system consists of spray shields, drip trays, collection pans and associated piping. The Fire Detection sub-system consists of fire detectors provided throughout the plant. The fire detectors are connected to an alarm which annunciates either in the Control Room or at local panels, which in turn, alarm in the Control Room. Components such as fire damper housings, fire doors, penetration seals, etc., are addressed in the structural scoping and screening commodity group Fire Protection Barriers (FPB). Appendix R components not specifically residing within the FP System are addressed within the individual systems for those components.

The FP System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the FP System support Fire Protection requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the FP System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the FP System subject to an AMR extend from the pump bays to the yard fire loops and include the pumps, carbon dioxide accumulator, hose stations, hydrants, spray/sprinkler heads, nozzles, Halon gas cylinders, RCP Lube Oil Collection components and associated piping, valves and instrumentation.

System Function Listing

A comprehensive listing of functions associated with the FP System, or specific components contained in the system, is provided in the summary below.

Code FP-01‘ Contains SCs relied upon to perform a Primary Containment Boundary Function.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The FP System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code FP-02 Supply backup water to the SA System and Screen Wash sub-system.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Provides a backup water supply to the instrument air compressor and after coolers and the Screenhouse Screen Wash sub-systems. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code FP-03 The Fire Detection sub-system detects a fire and initiates an alarm.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: The fire detectors provide alarms which annunciate in the Control Room.

Code FP-04 The RCP Oil Collection sub-system collects oil from potential pressurized and un-pressurized leakage sites and pipes the leakage to Sump "A" inside Containment.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains equipment that is credited in the 10 CFR 50, Appendix R Analysis.

Code FP-05 The Carbon Dioxide sub-system provides a sufficient supply of carbon dioxide to confine and extinguish a fire in the cable spreading and relay room.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: The Carbon Dioxide Suppression sub-system provides a total flood capability for the Relay/Computer Room area.

Code FP-06 The Halon sub-system provides a sufficient supply of Halon to confine and extinguish a fire in the Old Administration Building records vault, the Security Building computer room and the Service Building computer room.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: The Halon sub-system provides a sufficient supply of Halon to confine and extinguish any fire in these areas.

Code FP-07 The Fire Water sub-system provides a water supply for fire protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: The Fire Water sub-system consists of two dedicated fire pumps (one motor-driven and one diesel-driven) and a pump normally assigned to the Screen Wash sub-system which serves as a backup to the fire header.

Code FP-08 Provides a makeup source of water to the Spent Fuel Pool for alternate cooling capability.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Alternate Spent Fuel Pool cooling capability under anticipated malfunctions or failures can be obtained by boiling and use of makeup sources. No single makeup source is credited in the current licensing basis. There are several sources of makeup water; failure of any one source would not prevent other systems from satisfactorily providing emergency makeup water. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code FP-FP	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains equipment that is credited in the Fire Hazards Analysis.

Code FP-NSAS	Cri 1	Cri 2	Cri 3				
Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The FP System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions, including flooding, that could cause failure of safety related components.

USAR Reference

Additional FP System details are provided in Section 5.3.2.2.4.3, Section 10.3.1, and Table 1.3-2 of the USAR.

License Renewal Drawings

The License Renewal drawings for the FP System are listed below:

Common	Unit 1	Unit 2
LR-39228-1	LR-39228-2	LR-39228-5
LR-39228-3		
LR-39228-4		
LR-39603-4		
LR-100282		

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-9 along with each component's intended function(s).

Table 2.3.3-9 Fire Protection System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
FILTER/STRAINER ELEMENTS	FILTER
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
FIRE HYDRANTS	PRESSURE BOUNDARY

Table 2.3.3-9 Fire Protection System

Components	Intended Function
FLEX CONNECTIONS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	HEAT TRANSFER PRESSURE BOUNDARY
HEATERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RCP OIL COLLECTION	PRESSURE BOUNDARY
SPRAY NOZZLES	SPRAY
SPRINKLER HEADS	PRESSURE BOUNDARY SPRAY
TANKS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.10 Fuel Oil System

System Description

The Fuel Oil (FO) System is an auxiliary system designed to receive and store diesel fuel oil and deliver it to both safety and non-safety related components consisting of diesel generators, diesel driven cooling water pumps, a heating boiler, and a diesel driven fire pump. The FO System also provides a means of transferring fuel oil between fuel oil storage tanks and a means of filtering new and transferred oil. The FO System is a standby system.

The FO System for Unit 1 consists of fuel oil storage tanks, pumps, filters and necessary piping, valves and instruments. The system is designed to supply fuel oil to the two diesel cooling water pumps, two non-safety related diesels, the heating boiler and the fire pump, shared by Units 1 and 2, and the two Unit 1 emergency diesel generators. Piping, valves and pumps are provided to transfer fuel oil from any one fuel oil storage tank to any other fuel oil storage tank by using the proper valve lineup. The FO System for Unit 2 consists of a receiving tank, fuel oil storage tanks, pumps, filters and necessary piping, valves and instruments. The system is designed to supply fuel oil to the two Unit 2 emergency diesel generators. Piping is provided to permit the transfer of fuel oil from one storage tank to another storage tank or to the receiving tank by using the proper valve lineup. The PINGP Unit 1 and Unit 2 fuel oil storage tanks are provided with emergency fill connections.

The FO System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the FO System support Fire Protection and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the FO System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the FO System containing components subject to an AMR begin at the fuel oil fill connections and extend to the storage tanks and include the tanks, pumps, piping and valves, including the heating boiler fuel oil pumps and equipment located in the Turbine Building. The heating boiler fuel oil storage tanks are not included.

System Function Listing

A comprehensive listing of functions associated with the FO System, or specific components contained in the system, is provided in the summary below.

Code FO-01	Cri 1	Cri 2	Cri 3				
Receive, store and deliver fuel oil to both safety and non-safety related components.			FP	EQ	PTS	AT	SB
	X						

Comment: The FO System supplies the safety related diesel generators and cooling water pumps and the non-safety related diesel generators, fire protection pump and heating boiler.

Code FO-02	Cri 1	Cri 2	Cri 3				
Provides a means of transferring and filtering new and transferred oil.			FP	EQ	PTS	AT	SB
	X						

Comment: The six Unit 1 DG and CL pump Design Class I tanks are interconnected such that any tank can be manually aligned to supply any diesel day tank. Therefore any combination of tanks can be manually aligned to supply a diesel day tank.

Code FO-FP	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains required equipment that performs a Fire Protection Safe Shutdown Support Equipment function.

Code FO-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The FO System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components,

Code FO-SB Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: Provide fuel oil to support emergency diesel generator operation to power equipment essential to core heat removal, primary system integrity (i.e., RC pump seal cooling), secondary side heat removal, and process monitoring.

USAR Reference

Additional FO System details are provided in Section 10.3.13 of the USAR.

License Renewal Drawings

The License Renewal drawings for the FO System are listed below:

Common	Unit 1	Unit 2
LR-39232	None	LR-118252

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-10 along with each component's intended function(s).

Table 2.3.3-10 Fuel Oil System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
FILTER/STRAINER ELEMENTS	FILTER
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
FLAME ARRESTORS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY

Table 2.3.3-10 Fuel Oil System

Components	Intended Function
RESTRICTING ORIFICES	PRESSURE BOUNDARY THROTTLE
SIGHT GLASSES	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.11 Heating System

System Description

The Heating (HS) System is an auxiliary system that provides a temperate environment in the plant buildings for the protection of equipment and the comfort of personnel. In addition, the HS System provides steam for the operation of the condensate tank freeze protection heater and cleaning hose stations. The system also supplies an alternate source of steam for hoggers, air ejectors, gland sealing steam, and the water box air ejectors. The HS System includes the Process Steam sub-system which is designed to provide steam to the boric acid evaporators, boric acid batching tank and the waste evaporators. The HS System is an operating system.

The HS System is shared by Units 1 and 2 and consists of a heating boiler, converters, coils, pumps, tanks and the necessary piping, valves and instrumentation. Heating steam is supplied by the BL System as the primary source and the heating boiler as a backup source if both Units are shutdown. The steam is used to heat buildings using steam heating coils or by using steam-to-hot-water converters that provides hot water/antifreeze recirculation systems for heating. The heating steam to the Containment Vessels has been isolated. Heating steam to the hoggers, air ejectors, gland sealing steam and water box air ejectors can be aligned through normally closed manual valves.

The Process Steam sub-system is shared by Units 1 and 2 and consists of the necessary piping, valves and instrumentation designed to provide steam from the HS System to the boric acid evaporators, boric acid batching tank, waste evaporators and other non-safety related components in the Auxiliary Building.

The HS System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the HS System support Station

Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the HS System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the HS System containing components subject to an AMR begin at the BL System supply check valves and extend to the converters, coils, and other equipment, returning to the deaerator through the condensate return piping back to the heating boiler. The components include the boiler, heat exchangers, tanks, pumps, piping, and valves.

System Function Listing

A comprehensive listing of functions associated with the HS System, or specific components contained in the system, is provided in the summary below.

Code HS-01	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon to perform a Primary Containment Boundary Function.			FP	EQ	PTS	AT	SB
	X						

Comment: The HS System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code HS-02	Cri 1	Cri 2	Cri 3				
Provides heating for the main plant buildings.			FP	EQ	PTS	AT	SB

Comment: The HS System provides a temperate environment in the plant buildings for the protection of equipment and the comfort of personnel. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code HS-03	Cri 1	Cri 2	Cri 3				
Provides steam for the operation of auxiliary equipment.			FP	EQ	PTS	AT	SB

Comment: The HS System provides steam for the operation of the condensate storage tank freeze protection, cleaning hose stations, and supplies an alternate source of steam for the hoggers, air ejectors, Gland Steam System, and the water box air ejectors. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code HS-04	Cri 1	Cri 2	Cri 3				
The Process Steam sub-system provides steam for the operation of the boric acid and waste evaporators and the boric acid batching tank.			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code HS-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The HS System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code HS-SB Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: PINGP systems which form part of the containment isolation boundary are in scope for License Renewal to support the SBO containment isolation functional requirement.

USAR Reference

Additional HS System details are provided in Section 10.2.3, Section 11.1.4, Section 11.3.2 and Table 5.2-1 of the USAR.

License Renewal Drawings

The License Renewal drawings for the HS System are listed below:

Common	Unit 1	Unit 2
LR-39605-1	None	None
LR-39605-2		
LR-39605-3		

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-11 along with each component's intended function(s).

Table 2.3.3-11 Heating System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
HEATERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY

Table 2.3.3-11 Heating System

Components	Intended Function
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
SIGHT GLASSES	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
TRAPS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.12 Miscellaneous Gas System

System Description

The Miscellaneous Gas (CG) System is an auxiliary system that is designed to supply gases for various plant components. The CG System consists of the Nitrogen, Hydrogen and Carbon Dioxide sub-systems. Nitrogen is supplied to purge the vapor spaces of various NSSS components and to pressurize the SI accumulators and VC charging pump desurgers. Hydrogen is supplied to the Turbine Generators, VC System volume control tanks (VCTs) and other various NSSS components. Carbon Dioxide is supplied to provide a purge gas to the Turbine Generators and to the Incore Instrumentation. The CG System is an operating system.

The Nitrogen Gas sub-system is shared by Units 1 and 2. The system consists of liquid storage tanks, high pressure banks, regulators and the necessary piping, valves and instrumentation. The sub-system supplies the VC System charging pump desurgers; the WD System reactor coolant drain tank, waste evaporators and gas decay tanks; the SI System for the SI accumulators; and the RC System for the PRT.

The Hydrogen Gas sub-system is shared by Units 1 and 2. The system consists of storage tanks, high pressure piping, regulators and the necessary piping, valves and instrumentation. The sub-system supplies the VC System VCT for oxygen scavenging and the Turbine Generator as a coolant gas.

The Carbon Dioxide Gas sub-system is shared by Units 1 and 2. The system consists of storage tanks, high pressure piping, regulators and the necessary piping valves and instrumentation. The sub-system supplies the Turbine Generator for hydrogen purging. Separate high pressure bottles are located in each Unit's primary containment to supply the Incore Instrumentation components with a cover gas for protection to minimize corrosion.

Nitrogen piping and valves that perform or support a Primary Containment Boundary function supplying gas to the PRT are contained in this system. The CG System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). The portions of the CG System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the CG System containing components subject to an AMR begin outside containment at the piping supplying nitrogen gas to the PRT and end at the nitrogen piping connection to the PRT.

System Function Listing

A comprehensive listing of functions associated with the CG System, or specific components contained in the system, is provided in the summary below.

Code CG-01	Cri 1	Cri 2	Cri 3				
The Nitrogen Gas sub-system supplies gas to purge vapor spaces or pressurize various NSSS components.			FP	EQ	PTS	AT	SB

Comment: Nitrogen gas is supplied to the SI accumulators, PRT, RCDT, VCT, charging pump desurgers, various waste components, electrical penetrations, and various other plant components. Component isolation valves to support gas supplies to the various components are scoped with the system they supply. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CG-02	Cri 1	Cri 2	Cri 3				
The Hydrogen Gas sub-system supplies gas to the Turbine Generators, VCT and various other plant components.			FP	EQ	PTS	AT	SB

Comment: Component isolation valves to support gas supplies to the various components are scoped with the system they supply. There are no safety related components in the CG System for this function. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CG-03 The Carbon Dioxide sub-system supplies purge gas to the turbine generators and to the Incore Instrumentation.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Component isolation valves to support gas supplies to the various components are scoped with the system they supply. There are no safety related components in the CG System for this function. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CG-04 Contains SCs relied upon to perform a Primary Containment Boundary Function.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The Nitrogen sub-system in the CG System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code CG-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The CG System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

USAR Reference

Additional CG System details are provided in Section 9.3.2.1.4 and Section 9.3.2.1.5 of the USAR.

License Renewal Drawings

The License Renewal drawings for the CG System are listed below:

Common	Unit 1	Unit 2
LR-39247	None	None

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-12 along with each component's intended function(s).

Table 2.3.3-12 Miscellaneous Gas System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY

Table 2.3.3-12 Miscellaneous Gas System

Components	Intended Function
PIPING/FITTINGS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.13 Plant Sample System

System Description

The Plant Sample (SM) System is an auxiliary system that is designed to provide samples for laboratory analysis to evaluate reactor coolant and other auxiliary systems chemistry during normal operation. It has no emergency function. This system is normally isolated at the containment boundary. The SM System includes the Reactor Hot Sampling and the Sampling sub-systems. The SM System is a standby system.

The SM System for each PINGP Unit consists of sample connections, heat exchangers, pressure cylinders, sinks and necessary piping, valves and instrumentation. The sample chillers are shared by Units 1 and 2. Two types of samples are obtained by the SM System. The Reactor Hot Sampling supplies: 1) high temperature, high pressure RC System and SB System samples which originate inside containment; and 2) low temperature, low pressure samples from the VC and RH Systems. The Sampling sub-system obtains samples from various secondary side systems including the FW, CD and MS Systems.

The SM System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the SM System support Environmental Qualification and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the SM System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the SM System containing components subject to an AMR, begin at the sample points of the various systems and extend to the sampling stations in the Turbine and Auxiliary Building and include piping, valves, pumps, sample cylinders, and coolers.

System Function Listing

A comprehensive listing of functions associated with the SM System, or specific components contained in the system, is provided in the summary below.

Code SM-01 Contains SCs relied upon to perform a Primary Containment Boundary Function.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The SM System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code SM-02 Contains SCs that are part of the Reactor Coolant Pressure Boundary.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The SM System provides a boundary for containing the coolant under operating temperature and pressure conditions. It serves to confine radioactive material and limits to acceptable values any release of radioactive material to the secondary system and to other parts of the plant under conditions of either normal or abnormal reactor operation.

Code SM-03 The Reactor Hot Sampling sub-system provides samples for analysis on primary system chemistry.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The Reactor Hot Sampling sub-system provides samples for analysis of primary system chemistry. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code SM-04 The Sampling sub-system provides samples for analysis on secondary system chemistry.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The Sampling sub-system provides samples for analysis of secondary system chemistry. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code SM-EQ Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
				X			

Comment: The SM System contains required components listed in the EQ Master List that are important to safety and are required to perform their safety related function when exposed to a worst case post accident environment.

Code SM-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The SM System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code SM-SB Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: The SM System contains SCs that form part of the pressure boundary with the RC, FW and MS Systems which support coping for the SBO event through support of secondary side heat removal and forms part of the containment isolation boundary which supports the SBO containment isolation functional requirement.

USAR Reference

Additional SM System details are provided in Section 10.3.5 of the USAR.

License Renewal Drawings

The License Renewal drawings for the SM System are listed below:

Common	Unit 1	Unit 2
LR-39238	LR-XH-248-1-1	LR-XH-248-1-2
LR-39238-2		
LR-XH-248-1-3		

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-13 along with each component's intended function(s).

Table 2.3.3-13 Plant Sample System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	PRESSURE BOUNDARY

Table 2.3.3-13 Plant Sample System

Components	Intended Function
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
SIGHT GLASSES	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.14 Primary Containment Ventilation System

System Description

The Primary Containment Ventilation (ZC) System is an auxiliary system consisting of several sub-systems: The Containment Air Cooling sub-system is designed to remove heat from containment during normal plant operation and during and following design basis events. The Containment Dome Recirculation sub-system is designed to circulate and mix gases following a loss-of-coolant accident to prevent hydrogen accumulation. The Containment Vacuum Relief sub-system is designed to protect the reactor containment vessel against excess differential pressures. The Containment Internal Cleanup sub-system is designed to recirculate containment air through filters to clean up containment atmosphere prior to limited personnel access. The Containment Purge and In-Service Purge sub-systems are designed to provide fresh, tempered air for comfort during maintenance and refueling operations and to purge containment air through high efficiency particulate (HEPA) and charcoal filters. The Spent Fuel Pool Normal and Special Ventilation sub-systems are designed to provide ventilation of the spent fuel pool (SFP) area during normal operations and in the event that high radiation is detected. The Shield Building Ventilation sub-system collects the leakage from the reactor containment vessel penetrations into the annulus of the Shield Building and discharges it through particulate, absolute and charcoal (PAC) filters to the monitored vent. Portions of the ZC System are a standby system and portions are an operating system.

The Containment Air Cooling sub-system for each PINGP Unit consists of four fan-coil units and the necessary ducts, dampers and instrumentation. The fan coils re-circulate and cool the reactor containment vessel atmosphere. During normal conditions, the CL System or the Auxiliary Building Chilled Water sub-system provide a water supply for the fan coil heat loads. During accident conditions, the CL System provides a water supply for the heat loads. The ZC System also includes the Reactor Coolant Pump, Control Rod Drive Mechanism, Reactor Vessel Support Pad and Reactor Cavity Cooling sub-systems which consists of fans and the necessary ducts, dampers and instrumentation designed to remove normal heat loads during normal plant operation. The Containment Dome Recirculation sub-system for each PINGP Unit consists of four fans and the necessary ducts, dampers and instrumentation designed to circulate and mix gases during the period following the postulated loss-of-coolant accident when combustible gases could conceivably accumulate.

The Containment Internal Cleanup sub-system for each PINGP Unit consist of two separate trains of filters, fans and the necessary ducts, dampers and instrumentation designed to prepare the reactor containment vessel for personnel entry. This sub-system is not intended to operate in the post-accident environment. The Containment Purge and In-Service Purge sub-systems are shared by Units 1 and 2 and consist of filters, fans and the necessary ducts, dampers and instrumentation designed to provide fresh, tempered air for comfort during maintenance and refueling operations.

The Shield Building Ventilation sub-system for each PINGP Unit consists of two separate trains of filters, fans and the necessary ducts, dampers and instrumentation designed to collect the leakage from the reactor containment vessel penetrations into the annulus of the Shield Building and discharge it through PAC filters to the monitored vent. The PAC filters in the Shield Building Ventilation sub-system are equipped with a water deluge feature for the charcoal beds. The Vacuum Relief sub-system for each PINGP Unit consists of two trains of vacuum breakers and the necessary piping, valves and instrumentation designed to protect the reactor containment vessel against excessive differential pressure due to inadvertent and simultaneous operation of the Containment Air Cooling sub-system and the CS System.

The Spent Fuel Pool Normal and Special Ventilation sub-system is shared by Units 1 and 2 and consists of filters, fans and the necessary ducts, dampers and instrumentation. The completely enclosed Spent Fuel Pool area is normally ventilated and exhausted through a roughing and HEPA filter. In the event of high radiation in the pool area, signals from radiation monitors in the normal ventilation exhaust duct isolate and shutdown the normal ventilation and initiate Spent Fuel Pool Special Ventilation. Ventilation is then accomplished via the Spent Fuel Pool Special Ventilation sub-system which shares the exhaust portion of the Containment In-Service Purge sub-system.

The ZC System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the ZC System support Environmental Qualification, Fire Protection and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the ZC System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the Containment Air Cooling sub-system containing components subject to an AMR begin at the containment fan coil unit fans and extend to the exhaust ducts and include the ducts and dampers. The portions of the Containment Dome Recirculation sub-system containing components subject to an AMR begin at the intake ducts and extend to the exhaust ducts and include the fan and ducts. The portions of the Containment Purge and In-Service Purge sub-system containing components subject to an AMR are the duct and dampers located at the primary containment penetration.

The portions of the Shield Building Ventilation sub-system containing components subject to an AMR begin at the intake ducts and extend to the exhaust duct and include the fan, filters, deluge piping, ducts, dampers and valves. The portions of the Containment Vacuum Relief sub-system containing components subject to AMR begin at the containment penetration and extend to the exhaust pipe and include the piping and valves.

The portions of the Spent Fuel Pool Special Ventilation sub-system containing components subject to an AMR begin at the supply duct located at the Spent Fuel Pool area, through the Spent Fuel Special & Containment Monitoring In-service Purge Filter and the In-service Purge Exhaust Fan and exhaust filter to the Shield Building Exhaust Stack including the duct, fans, filters and dampers.

System Function Listing

A comprehensive listing of functions associated with the ZC System, or specific components contained in the system, is provided in the summary below.

Code ZC-01	Cri 1	Cri 2	Cri 3				
The Containment Air Cooling sub-system removes heat from the reactor containment following a loss-of-coolant or main steam line break accident.			FP	EQ	PTS	AT	SB
	X						

Comment: The Containment Air Cooling sub-system, working in parallel with the CS System, is designed to remove sufficient heat from the reactor containment to keep the containment from exceeding the design pressure and temperature.

Code ZC-02	Cri 1	Cri 2	Cri 3				
The Containment Air Cooling sub-system removes the normal heat loss from equipment and piping in the reactor containment during normal plant operation.			FP	EQ	PTS	AT	SB

Comment: This function is supported by the Reactor Coolant Pump, Control Rod Drive Mechanism, Reactor Vessel Support Pad and Reactor Cavity Cooling sub-systems. None of these sub-systems are required to operate during post accident conditions. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code ZC-03	Cri 1	Cri 2	Cri 3				
The Containment Dome Recirculation sub-system is designed to circulate and mix gases following a loss-of-coolant accident to prevent hydrogen accumulation.			FP	EQ	PTS	AT	SB
	X						

Comment: None

Code ZC-04	Cri 1	Cri 2	Cri 3				
The Vacuum Relief sub-system is provided to protect the reactor containment vessel against excess differential pressures.			FP	EQ	PTS	AT	SB
	X						

Comment: Differential pressure conditions (vacuum) may exist inside the containment if containment vessel heat removal capability exceeds the heat inputs during normal or post accident operations.

Code ZC-05	Cri 1	Cri 2	Cri 3				
The Containment Internal Clean-up sub-system is designed to recirculate containment air through filters to clean up containment atmosphere prior to limited personnel access.			FP	EQ	PTS	AT	SB

Comment: This sub-system is not intended to operate in the post-accident environment. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code ZC-06 Contains SCs relied upon to perform a Primary Containment Boundary Function.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The ZC System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive material.

Code ZC-07 The Containment Purge and In-Service Purge sub-systems are designed to provide fresh, tempered air for comfort during maintenance and refueling operations and to purge containment air through HEPA and charcoal filters.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The in-service purge is credited with providing defense in depth for fuel handling accidents.

Code ZC-08 The Spent Fuel Pool Normal and Special Ventilation sub-systems are designed to provide ventilation of the SFP area during normal operations and in the event that high radiation is detected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The SFP is normally ventilated and exhausted through roughing and HEPA filters. In the event of high radiation in the pool area, the normal ventilation is shutdown and the special ventilation is initiated to exhaust the air through PAC filters. The special ventilation is also credited with providing filtration for a SFP fuel handling accident.

Code ZC-09 The Shield Building Ventilation sub-system is designed to minimize the release of radioactivity from the reactor containment system following design basis accidents.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: Fans and ducts produce a slightly negative pressure within the annulus to collect any of the leakage from the reactor containment vessel into the Shield Building and provide mixing, clean-up and discharge through PAC filters.

Code ZC-10 Contains components that provide input to the reactor protection and engineered safeguards features equipment.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The instrumentation provided ensures safe and orderly operation of systems and processes over the full operating range of the plant.

Code ZC-EQ Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
				X			

Comment: The ZC System contains required components listed in the EQ Master List that are important to safety and are required to perform their safety related function when exposed to a worst case post accident environment.

Code ZC-FP Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains required equipment that performs a Fire Protection Safe Shutdown Support Equipment function.

Code ZC-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The ZC System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code ZC-SB Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: Provides heat removal from the containment air space in support of coping with the SBO event.

USAR Reference

Additional ZC System details are provided in Section 5.2.1, Section 5.2.2, Section 5.2.3, Section 5.3.2, Section 5.4.2.3, Section 6.3.1 and Section 10.3.7 of the USAR.

License Renewal Drawings

The License Renewal drawings for the ZC System are listed below:

Common	Unit 1	Unit 2
None	LR-39602-1	LR-39602-2

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-14 along with each component's intended function(s).

Table 2.3.3-14 Primary Containment Ventilation System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
DAMPER/HOUSINGS	PRESSURE BOUNDARY
DUCTING AND COMPONENTS	PRESSURE BOUNDARY
FAN HOUSINGS	PRESSURE BOUNDARY
FILTER/STRAINER ELEMENTS	FILTER
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
FLEX CONNECTIONS	PRESSURE BOUNDARY
FLOW ELEMENTS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	HEAT TRANSFER PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
SAMPLE POINTS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.15 Radiation Monitoring System

System Description

The Radiation Monitoring (RD) System is an auxiliary system designed to provide information to warn operations personnel of potential radiological hazards that have developed, give early warning of certain plant malfunctions indicated by changing radiological conditions, prevent or minimize the release of radioactivity by automatically isolating or redirecting plant processes, provide for routine monitoring of controlled plant offsite effluent releases, and provide accident monitoring information of plant conditions for use in accident assessment. The RD System includes the Process, the Area and the Environmental Radiation Monitoring sub-systems, and the Health Physics and Laboratory Radiation Measuring sub-system. The RD System is an operating system.

The Process Radiation Monitoring sub-system for each PINGP Unit consists of radiation detectors, heat exchangers and the necessary piping, valves and instrumentation, designed to provide a flow path from the process system to the radiation detectors. Where required, radiation monitoring channels are capable of initiating alarms and actuating control equipment to assure confinement of radioactive materials. Portions of the Process Radiation Monitoring sub-system are required to perform a 54.4(a)(1) function to support a safety related system function. Some portions of the sub-system are shared by Units 1 and 2.

The Area and Environmental Radiation Monitoring sub-systems are shared by Units 1 and 2 and consist of radiation detectors designed to provide indication and alarms functions for general radiation levels. The Health Physics and Laboratory Radiation Measuring sub-systems are shared by Units 1 and 2 and consist of portable radiation survey instruments available to measure radiation and contamination during normal and accident plant conditions. None of the components in these sub-systems provide functions that meet the criteria listed in 10CFR 54.4(a)(1), (2) or (3).

The electrical (detector, monitor and indicator) components in the Process and Area Radiation Monitoring sub-systems have been transferred to the “Radiation Monitors” commodity group for further evaluation. The RD System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the RD System support Environmental Qualification and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the RD System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the RD System containing components subject to an AMR begin at the safety related process system connections and extend to the process system return or waste discharge connection and include the heat exchangers, piping and valves.

System Function Listing

A comprehensive listing of functions associated with the RD System, or specific components contained in the system, is provided in the summary below.

Code RD-01	Cri 1	Cri 2	Cri 3				
The Area Radiation Monitoring sub-system provides information to warn operating personnel of potential radiological health hazards during normal and accident plant conditions.			FP	EQ	PTS	AT	SB

Comment: Provides information of a general operational nature useful in assessing radiation exposures to personnel. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code RD-02	Cri 1	Cri 2	Cri 3				
The Process Radiation Monitoring sub-system provides information on conditions which might cause radiological hazards, prevent or minimize the effects of inadvertent radiation releases and provides monitoring of planned offsite releases.			FP	EQ	PTS	AT	SB
	X						

Comment: Where required, radiation monitoring channels are capable of initiating alarms and actuating control equipment to assure confinement of radioactive materials. Portions of the Process Radiation Monitoring sub-system are required to perform a 54.4(a)(1) function to support a safety related system function.

Code RD-03	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon to perform a Primary Containment Boundary Function.			FP	EQ	PTS	AT	SB
	X						

Comment: The RD System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code RD-04	Cri 1	Cri 2	Cri 3				
The Health Physics and Laboratory Radiation Measuring sub-system provides instruments for measurement of radiation expected during normal and accident plant conditions.			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code RD-05 The Environmental Radiation Monitoring sub-system provides information to assess the impact of plant operation on the surrounding environment and evaluate the performance of systems and equipment installed to control release of radioactive materials.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code RD-EQ Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
				X			

Comment: The RD System contains required components listed in the EQ Master List that are important to safety and are required to perform their safety related function when exposed to a worst case post accident environment.

Code RD-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The RD System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code RD-SB Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: PINGP systems which form part of the containment isolation boundary are in scope for License Renewal to support the SBO containment isolation functional requirement.

USAR Reference

Additional RD System details are provided in Section 1.2.3, Section 2.7 and Section 7.5 of the USAR.

License Renewal Drawings

The License Renewal drawings for the RD System are listed below:

Common	Unit 1	Unit 2
LR-39790-1	LR-39790-3	LR-39790-4
LR-39790-2	LR-39790-5	LR-39790-6
LR-39790-9	LR-39790-11	LR-39790-12
LR-39790-10		

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-15 along with each component's intended function(s).

Table 2.3.3-15 Radiation Monitoring System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.16 Spent Fuel Pool Cooling System

System Description

The Spent Fuel Pool Cooling (SF) System is an auxiliary system designed to remove the heat generated by stored spent fuel elements. The system provides purification of the spent fuel pool water, the RWST and the reactor cavity to reduce radiation levels and improve clarity. The SF System includes the Spent Fuel Pool Leakage and Refueling Pool Cleanup sub-systems. The SF System is an operating system.

The SF System is shared by Units 1 and 2. The SF System consists of two pumps, two heat exchangers, filters, demineralizer, refueling water purification pumps and the necessary piping (including the fuel transfer tube), valves and instrumentation. System piping is arranged so that a failure of any pipeline does not drain the spent fuel pool below the top of the stored spent fuel elements. A separate RWST purification pump for each Unit can be used to circulate the Refueling Water Storage Tanks through the purification loop. A skimmer pump and filter are provided for surface skimming of the spent fuel pool water. The SF pumps draw water from the spent fuel pool, circulate it through a heat exchanger and return it to the pool. The CC System cools the heat exchanger. Borated water is used to fill the spent fuel storage pool to ensure sub-critical conditions at all times and provides an optically transparent radiation shield. The Refueling Pool Cleanup sub-system for each Unit consists of one pump, filters and the necessary piping, valves and instrumentation, designed to reduce radiation levels and improve clarity for the reactor cavity during refueling outages. The Spent Fuel Pool Leakage sub-system includes piping and valves that route the fuel pool liner leakage to plant sumps to aid in leak location determination and to provide drainage.

The SF System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). The portions of the SF System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

Portions of the SF System containing components subject to an AMR begin at the spent fuel pool suction pipe, and extend to the discharge pipe and include the pumps, heat exchangers, filters, demineralizers, piping and valves and include the fuel transfer tube.

System Function Listing

A comprehensive listing of functions associated with the SF System, or specific components contained in the system, is provided in the summary below.

Code SF-01	Cri 1	Cri 2	Cri 3				
Removes the heat generated by spent fuel elements stored in the spent fuel pool.			FP	EQ	PTS	AT	SB

Comment: The SF System is designed to remove the heat generated by stored spent fuel elements. Alternate cooling capability under anticipated malfunctions or failures can be obtained by boiling and use of makeup sources from the VC System, FP System or SI System. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code SF-02	Cri 1	Cri 2	Cri 3				
Provide purification of the spent fuel pool water and RWST water to reduce radiation levels in the area and improve clarity.			FP	EQ	PTS	AT	SB

Comment: The clarity and purity of the spent fuel pool water is maintained by passing the water flow through a purification loop. Additionally the purification loop can be used to maintain the purity of both Units' RWSTs. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code SF-03 Provide adequate shielding for radiation protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Adequate shielding for radiation protection is provided by conducting all spent fuel transfer and storage operations under water. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code SF-04 The Refueling Pool Cleanup sub-system provides purification of the refueling pool to reduce radiation levels in the area and improve clarity.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Equipment is provided inside containment for each Unit to operate during refueling outages to maintain refueling pool water conditions. The system is inspected prior to each use. After draining the refueling cavity, the system is vented and drained. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code SF-05 Contains SCs relied upon to perform a Primary Containment Boundary Function.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The SF System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials. The fuel transfer tube and blank flange with double O-ring seal constitute the containment boundary.

Code SF-06 The Spent Fuel Pool Leakage sub-system provides leakage detection and drain routing for the fuel pool liner.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Fuel pool liner channels direct any leakage to piping and valves that route the leakage to plant sumps to aid in leak location determination and provide drainage. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code SF-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The SF System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code SF-SB	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.							X

Comment: PINGP systems which form part of the containment isolation boundary are in scope for License Renewal to support the SBO containment isolation functional requirement. The fuel transfer tube flange provides SF System containment isolation.

USAR Reference

Additional SF System details are provided in Section 1.2.8, Section 1.3.6, Section 10.2.1.2, Section 10.2.2, and Table 1.3-3 of the USAR.

License Renewal Drawings

The License Renewal drawings for the SF System are listed below:

Common	Unit 1	Unit 2
LR-XH-1-29	None	None

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-16 along with each component's intended function(s).

Table 2.3.3-16 Spent Fuel Pool Cooling System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
DEMINERALIZERS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.17 Station and Instrument Air System

System Description

The Station and Instrument Air (SA) System is an auxiliary system that is designed to provide a continuous supply of oil-free, dry, instrument air as required. The system also provides oil-free, compressed service air to hose stations throughout the plant and to the Condensate Polishing Backwash Air Supply sub-system for resin backwashing operations. The SA System includes the Backup Accumulators and Compressed Air sub-systems that provide backup air for the RC System power-operated relief valves (PORVs), the turbine driven auxiliary feedwater pump steam admission control valves, the CL System strainer backwash valves and Safeguards Chilled Water sub-system components. The SA System is an operating system.

The SA System is shared by Units 1 and 2. The Instrument Air sub-system consists of compressors, coolers, dryers, receivers and the necessary piping, valves and instrumentation to supply a common air header that supplies separate headers for each Unit. Each Unit's air header is provided with an air dryer that supplies air to that Unit's Turbine, Reactor and Auxiliary Buildings. A normally closed cross tie is provided between the two Units. Instrument air is not essential for plant safety during a design basis accident, however, for non-safeguards reasons, it is desirable to maintain instrument air if possible. The Station Air sub-system consists of compressors, coolers, dryers, receivers and the necessary piping, valves and instrumentation to supply compressed air to general plant areas and to the Condensate Polishing sub-system. A motor-operated isolation valve is provided which can be used to cross-tie the instrument air header to the station air header. The Accumulators and Compressed Air Supply sub-systems for each PINGP Unit consist of accumulators, compressed air bottles and necessary piping, valves and instrumentation designed to assure operability of the supplied equipment.

The SA System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions of the SA System support Environmental Qualification, Fire Protection and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the SA System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The in-scope portion of the SA System starts at the compressors and includes the interconnected pipe and valves to provide a pressure boundary for the system to support continued operation of components that require air to continue operation. Also included are the Accumulators and Compressed Air Supply sub-systems that support safety related equipment.

The portions of the SA System containing components subject to an AMR begin at the discharge of the air compressors and extend to the aftercoolers, dryers, receivers and associated piping, valves and instrumentation.

System Function Listing

A comprehensive listing of functions associated with the SA System, or specific components contained in the system, is provided in the summary below.

Code SA-01 Provide Backup Accumulators and Compressed Air sub-systems that provide backup air to safety related equipment.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: Backup air accumulators are provided for the RC System PORVs, Containment Vacuum Breakers, and the turbine driven auxiliary feedwater pump steam admission control valve. Backup Compressed Air sub-systems are provided for the CL System strainer backwash valves, the Safeguards Chilled Water System components and the RC System PORVs.

Code SA-02 Provide a continuous supply of oil-free compressed air to areas of the plant as required.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The Instrument Air sub-system supplies dried control air to plant components. The Station Air sub-system supplies non-dried air to the Condensate Polishing sub-system and dried air to plant station air headers. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code SA-03 Contains SCs relied upon to perform a Primary Containment Boundary Function.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The SA System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code SA-EQ Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
				X			

Comment: The SA System contains required components listed in the EQ Master List that are important to safety and are required to perform their safety related function when exposed to a worst case post accident environment.

Code SA-FP Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains required equipment that performs a Fire Protection Safe Shutdown Support Equipment function.

Code SA-SB Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: The SA System provides compressed air used to support operation of the charging pump (VC System) speed controllers, control room chiller units (ZN System), and pressurizer and main steam power operated relief valves for establishing natural circulation and secondary heat removal in support of SBO event coping. Portions of the SA System, including the air compressors, whose pressure boundary function is required to supply these air loads are in scope for License Renewal.

USAR Reference

Additional SA System details are provided in Section 4.4.2.3.1, Section 8.4.2, Section 10.3.10.1, Section 10.4.1.2, Section 10.4.3.2, Section 11.8.2.4, and Section 11.9.2.2 of the USAR.

License Renewal Drawings

The License Renewal drawings for the SA System are listed below:

Common	Unit 1	Unit 2
LR-39243 LR-39244 LR-39253-3	None	None

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-17 along with each component's intended function(s).

Table 2.3.3-17 Station and Instrument Air System

Components	Intended Function
AIR DRYERS	PRESSURE BOUNDARY
AIR REGULATORS	PRESSURE BOUNDARY

Table 2.3.3-17 Station and Instrument Air System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
FLEX CONNECTORS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
SIGHT GLASSES	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.18 **Steam Exclusion System**

System Description

The Steam Exclusion (SE) System is an auxiliary system that is designed to provide ventilation isolation to protect the systems and components required to detect and mitigate the consequences of a high energy line break. The SE System is a standby system.

The SE System is shared by Units 1 and 2 and consists of the necessary ducts, dampers and instrumentation designed to provide redundant isolation dampers (control or check dampers) in each ventilation duct that penetrates those compartments designated as steam exclusion zones. These zones include the Relay Room, Control Room, Control Room Ventilation Equipment Rooms, Auxiliary Building elevation 695’ and Design Class I portions of the Turbine Building. Air-operated dampers are automatically closed by resistance temperature detectors, located in their respective ductwork, to isolate the designated areas from potentially harsh environments due to a high energy line break.

The SE System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). The portions of the SE System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the SE System containing components subject to an AMR begin at the boundary wall and continue to the outermost damper and include the necessary ducts and dampers for each credited ventilation system isolation.

System Function Listing

A comprehensive listing of functions associated with the SE System, or specific components contained in the system, is provided in the summary below.

Code SE-01	Cri 1	Cri 2	Cri 3				
Provide ventilation isolation to protect the systems and components required to detect and mitigate the consequences of a high energy line break.			FP	EQ	PTS	AT	SB
	X						

Comment: In areas where the ventilation system provides possible steam communication paths to those compartments designated as steam exclusion zones, redundant isolation dampers in the ventilation system automatically close to isolate the desired envelope.

Code SE-NSAS	Cri 1	Cri 2	Cri 3				
Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The SE System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

USAR Reference

Additional SE System details are provided in Section 10.3.3.2.1, Section 12.2.2.5.9, and Appendix I.2.2 of the USAR.

License Renewal Drawings

The License Renewal drawings for the SE System are listed below:

Common	Unit 1	Unit 2
LR-39600	None	None
LR-39601		
LR-39603-1		

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-18 along with each component's intended function(s).

Table 2.3.3-18 Steam Exclusion System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
DAMPER/HOUSINGS	PRESSURE BOUNDARY
DUCTING AND COMPONENTS	PRESSURE BOUNDARY

2.3.3.19 Turbine and Administration Building Ventilation System

System Description

The Turbine and Administration Building Ventilation (ZB) System includes several sub-systems. The ZB System sub-systems are auxiliary systems designed to provide tempered air and remove exhaust air to provide a suitable working environment and maintain temperatures required by machinery in various buildings and areas throughout the plant. In addition, the Technical Support Center (TSC) Ventilation and Cleanup sub-system operates to provide emergency response facility habitability under accident conditions. The ZB System includes the Turbine Building, Old Admin Building, New Admin Building, Cold Chemical Lab, and TSC Ventilation and Cleanup sub-systems. The ZB System is an operating system.

The Turbine Building Ventilation sub-system is shared by Units 1 and 2 and consists of ventilation fans, exhaust fans and the necessary ducts, dampers and instrumentation designed to provide air and remove exhaust air from the Turbine Building. The turbine building roof exhaust fans are required to be shutdown when required as part of the Emergency Operating Procedures to reduce the likelihood of contamination release. An Air Conditioning sub-system is supplied for the D3 (lunch) room and for the battery rooms to increase the life span of the safeguard battery banks. The Cold Chemical Lab Ventilation sub-system is shared by Units 1 and 2 and consists of ventilation fans, exhaust fans and the necessary ducts, dampers and instrumentation designed to provide air and remove exhaust air from the Cold Chemical Lab.

The Old Administration Building Ventilation and New Administration Building Ventilation sub-systems are shared by Units 1 and 2 and consists of ventilation fans, exhaust fans and the necessary ducts, dampers and instrumentation designed to provide tempered and filtered air and remove exhaust air from the Administration Buildings to ensure a suitable working environment for personnel and equipment. An Air Conditioning sub-system is also supplied for the plant Telephone Equipment room.

In areas where the ventilation system provides possible steam communication paths to the compartments designated as steam exclusion zones, redundant isolation dampers in the ventilation system automatically close to isolate the desired envelopes; the portions of the ZB System that perform this Steam Exclusion Boundary function have been moved to the SE System for further evaluation. Portions of the ZB System are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the ZB System support Fire Protection requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the ZB System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the ZB System subject to an AMR are those components required to support the Steam Exclusion System and the Fire Protection requirements.

System Function Listing

A comprehensive listing of functions associated with the ZB System, or specific components contained in the system, is provided in the summary below.

Code ZB-01	Cri 1	Cri 2	Cri 3				
The Technical Support Center Ventilation and Cleanup sub-system provides air and filtration, and removes exhaust air, to provide a suitable working environment.			FP	EQ	PTS	AT	SB

Comment: The TSC Ventilation and Cleanup sub-system operates to provide emergency response facility habitability under accident conditions. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code ZB-02	Cri 1	Cri 2	Cri 3				
The Old Administration Building Ventilation sub-system provides tempered air and removes exhaust air to provide a suitable working environment.			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code ZB-03	Cri 1	Cri 2	Cri 3				
The Cold Chemical Lab Ventilation sub-system provides tempered air and removes exhaust air to provide a suitable working environment.			FP	EQ	PTS	AT	SB

Comment: Provides a means to exhaust fumes from the chemical sampling area. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code ZB-04 The Turbine Building Ventilation sub-system provides air and removes exhaust air to provide a suitable working environment and maintain temperatures required by machinery.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Provides cooling to Turbine Building equipment, including the Battery Rooms. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code ZB-05 The New Administration Building Ventilation sub-system provides tempered air and removes exhaust air to provide a suitable working environment.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function applies to the New Administration Building attached to the Turbine Building, and the New Administration Building located Northwest of the Turbine Building. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code ZB-FP Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains required equipment that performs a Fire Protection smoke removal function.

Code ZB-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The Turbine Building Ventilation sub-system contains non-safety related components that maintain the ability to shutdown the turbine building exhaust fans when required as part of the 1E-0 [2E-0] procedures and whose failure could prevent satisfactory accomplishment of the safety related function of the Auxiliary Building Special Ventilation sub-system. In addition, the ZB System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure or safety related components.

USAR Reference

Additional ZB System details are provided in Section 10.3.9, Figure 10.3-7, Figure 10.3-11 and Figure 10.3-12 of the USAR.

License Renewal Drawings

The License Renewal drawing for the ZB System is listed below:

Common	Unit 1	Unit 2
LR-39601	None	None

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-19 along with each component's intended function(s).

Table 2.3.3-19 Turbine and Administration Building Ventilation System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
DUCTING AND COMPONENTS	PRESSURE BOUNDARY
FAN HOUSINGS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.20 Waste Disposal System

System Description

The Waste Disposal (WD) System is an auxiliary plant system that is designed to collect, process, store and dispose of all potentially radioactive reactor plant wastes while meeting the limits established by regulations for release of wastes from the plant site. The WD System consists of the Waste Liquid, Waste Gas and Waste Solid Disposal sub-systems and the Site Miscellaneous Maintenance sub-system. The Waste Gas, Waste Liquid and Site Miscellaneous Maintenance sub-systems are operating systems. The Waste Solid sub-system is a standby system.

The Waste Liquid Disposal sub-system is shared by Units 1 and 2 and consists of tanks, filters, pumps, ion exchangers, evaporators and the necessary piping, valves and instrumentation. The Waste Liquid sub-system is comprised of the Reactor Coolant Drains, Auxiliary and Reactor Building Drains, Steam Generator Blowdown Treatment, Non-Aerated Drains, Aerated Drains, Chemical Drains and the alternate discharge path from the turbine building sump. Fluids entering the Waste Liquid sub-system are collected in intermediate holding tanks for determination of subsequent treatment and then are processed as required for reuse or released under controlled conditions.

The system is designed to accommodate the radioactive input resulting from the design basis maximum fuel leakage condition. Evaporators originally provided for processing are currently not used.

The Waste Gas Disposal sub-system is shared by Units 1 and 2 and consists of two interconnected process loops consisting of tanks, compressors, hydrogen re-combiners, gas analyzer and the necessary piping, valves and instrumentation. The low level loop is designed to contain and process gases which accumulate as a result of plant operations. The gas is continuously processed through the hydrogen re-combiner and the decay tanks or released under controlled conditions. The high level loop was designed to contain and process gases with high activity received during hydrogen stripping of the reactor coolant to remove fission gases, however, due to the low activity levels in the RC System, the high level waste gas loop is idle and the tanks are used for reserve holdup capacity of the low level loop gas. A rupture of the waste gas decay tanks does not result in offsite exposures comparable to those referred to in 10CFR 100.11 and therefore the tanks are not within the scope of License Renewal.

The Waste Solid Disposal sub-system is shared by Units 1 and 2 and consists of trash compactors, resin liners, tanks and the necessary piping, valves and instrumentation. The trash compactors are designed to compact dry active waste for disposal or storage. The resin liner is designed to collect resin from several system ion exchangers for disposal. Waste Solidification components, consisting of tanks, piping and valves, is provided to mix moist radioactive waste with cement for disposal; this equipment is currently not used.

The Site Miscellaneous Maintenance sub-system is a designation used in the work management process for tracking building maintenance. This system includes laundry equipment.

The WD System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the WD System support Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the WD System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the Waste Liquid Disposal sub-system containing components subject to AMR begin at the drains and collection points and extend to the tanks and release lines and include the tanks, pumps, ion exchangers, evaporators, piping and valves. The portions of the Waste Gas and Waste Solid Disposal sub-systems containing components subject to AMR include the compressors, tanks, piping and valves which contain liquids.

System Function Listing

A comprehensive listing of functions associated with the WD System, or specific components contained in the system, is provided in the summary below.

Code WD-01	Cri 1	Cri 2	Cri 3				
The Waste Liquid Disposal sub-system is designed to collect, process and dispose of all radioactive liquid wastes generated in the operation of the plant.			FP	EQ	PTS	AT	SB

Comment: The sub-system is designed to accommodate the radioactive input resulting from the design basis maximum fuel leakage condition. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code WD-02	Cri 1	Cri 2	Cri 3				
The Waste Solid Disposal sub-system is designed to package, store and provide shielded storage facilities for solid wastes.			FP	EQ	PTS	AT	SB

Comment: The sub-system allows for storage prior to shipment from the plant for offsite processing or disposal. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code WD-03	Cri 1	Cri 2	Cri 3				
The Waste Gas Disposal sub-system is designed to process and control the release of gaseous radioactive effluents.			FP	EQ	PTS	AT	SB

Comment: Releases are controlled so that the offsite radiation dose rate does not exceed the limits specified by applicable regulations. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code WD-04	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon to perform a Primary Containment Boundary Function.			FP	EQ	PTS	AT	SB
	X						

Comment: The WD System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code WD-05	Cri 1	Cri 2	Cri 3				
The Site Miscellaneous Maintenance sub-system is a designation used in the work management process for tracking building maintenance. This system includes laundry equipment.			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code WD-NSAS	Cri 1	Cri 2	Cri 3				
Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The WD System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code WD-SB	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.			FP	EQ	PTS	AT	SB
							X

Comment: PINGP systems which form part of the containment isolation boundary are in scope for License Renewal to support the SBO containment isolation functional requirement.

USAR Reference

Additional WD System details are provided in Section 1.2.9, Section 1.3.5, Section 9.1.1, Section 9.1.2, Section 9.3.2, Section 9.4.2, Section 11.8.2.3, Section 14.5.3, and Section 14.5.3.2 of the USAR.

License Renewal Drawings

The License Renewal drawings for the WD System are listed below:

Common	Unit 1	Unit 2
LR-XH-1-123	None	None
LR-XH-1-124		
LR-XH-550-1		
LR-XH-550-6-1		
LR-XH-550-6-2		
LR-39236		
LR-39248		
LR-39249		
LR-39250		
LR-88740		
LR-XH-1-664		

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-20 along with each component's intended function(s).

Table 2.3.3-20 Waste Disposal System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
DECONTAMINATION EQUIPMENT	PRESSURE BOUNDARY
DEMINERALIZERS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
FLEX CONNECTIONS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
RUPTURE DISCS	PRESSURE BOUNDARY
SIGHT GLASSES	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.21 Water Treatment System

System Description

The Water Treatment (DE) System is an auxiliary system that supplies demineralized and domestic (potable) water to meet plant requirements. The DE System includes the Domestic Water and Sewer sub-systems. The DE System is an operating system.

The DE System is shared by Units 1 and 2 and consists of wells, tanks, pumps, ion exchangers, reverse osmosis units and the necessary piping, valves and instrumentation. The plant is supplied with water from deep-wells located on the plant site. The deep-well pumps supply water to a well water tank which is then directed to the Domestic Water sub-system or to the water treatment components for de-ionization and deoxygenating before being supplied to the condensate, reactor makeup or demineralized water plant supply. The Domestic Water sub-system is shared by Units 1 and 2 and consists of tanks, pumps, heaters, water softeners and the necessary piping, valves and instrumentation designed to provide potable water to the plant. The Sewer sub-system is shared by Units 1 and 2 and consists of tanks, pumps and the necessary piping, valves and instrumentation designed to provide a sanitary drain system for domestic waste such as the shower drains, sink drains and commodes. The Domestic Water and Sewer sub-systems for the New Administration Building are totally independent of the plant sub-systems.

The DE System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). The portions of the DE System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the DE System containing components subject to an AMR begin at the piping as it enters the Turbine Building and extend to the supplied components and include the pumps, tanks, ion exchangers, reverse osmosis units, piping and valves. The portions of the Domestic Water sub-system containing components subject to an AMR begin at the well water tank and extend to the supplied components and include the pumps, tanks, water softeners, piping and valves. The portions of the Sewer sub-system containing components subject to an AMR begin at the collection points and extend to the point the piping exits the Turbine Building.

System Function Listing

A comprehensive listing of functions associated with the DE System, or specific components contained in the system, is provided in the summary below.

Code DE-01	Cri 1	Cri 2	Cri 3				
To provide demineralized water makeup to the condensate storage tanks, reactor makeup tanks, CD System, and demineralized water services.			FP	EQ	PTS	AT	SB

Comment: The DE System provides a makeup source of demineralized water for plant process systems. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code DE-02	Cri 1	Cri 2	Cri 3				
The Domestic Water sub-system provides potable water to the plant.			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code DE-03	Cri 1	Cri 2	Cri 3				
The Sewer sub-system provides a sanitary drain system for domestic wastes.			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code DE-04	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon to perform a Primary Containment Boundary Function.			FP	EQ	PTS	AT	SB
	X						

Comment: The DE System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code DE-NSAS	Cri 1	Cri 2	Cri 3				
Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The DE System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components

USAR Reference

Additional DE System details are provided in Section 5.2.2.1 of the USAR.

License Renewal Drawings

The License Renewal drawings for the DE System are listed below:

Common	Unit 1	Unit 2
LR-39241-1	None	None
LR-39241-3		
LR-39241-4		
LR-39241-5		
LR-39241-6		
LR-39241-7		
LR-39241-8		
LR-39242		

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.3-21 along with each component's intended function(s).

Table 2.3.3-21 Water Treatment System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
DEMINERALIZERS	PRESSURE BOUNDARY
EDUCTORS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
FLEX CONNECTIONS	PRESSURE BOUNDARY
HEATERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
SIGHT GLASSES	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.4 Steam and Power Conversion System

The following systems are addressed in this section:

- Auxiliary Feedwater System (Section 2.3.4.1)
- Bleed Steam System (Section 2.3.4.2)
- Circulating Water System (Section 2.3.4.3)
- Condensate System (Section 2.3.4.4)
- Feedwater System (Section 2.3.4.5)
- Main Steam System (Section 2.3.4.6)
- Steam Generator Blowdown System (Section 2.3.4.7)
- Turbine Generator and Support System (Section 2.3.4.8)

2.3.4.1 Auxiliary Feedwater System

System Description

The Auxiliary Feedwater (AF) System is a steam and power conversion system that provides feedwater to the steam generators for heat removal from the RC System during and following design basis events including loss of normal feedwater, steam generator tube rupture, main steam or feedwater line break, small break LOCA and during normal operation, such as startup and shutdown, when the main FW System is not available. The AF System is a standby system during normal plant operation.

The AF System for each Unit consists of one turbine-driven and one electric-driven pump and the necessary piping, valves and instrumentation. The AF System is redundant and delivers feedwater from the condensate storage tank or from the CL System to the main feedwater piping at a location near the steam generator inlet. The AF System is used during plant startup and shutdown and during hot shutdown or hot standby conditions when small feedwater flow requirements do not warrant the operation of the main FW System. The Chemical Feed sub-system may also be aligned to the AF System for secondary chemistry control. The AF System is directly relied upon as part of engineered safeguards to prevent core damage and system overpressurization in the event of transients such as a loss of normal feedwater, secondary system pipe rupture, and to provide a means for plant cooldown following any plant transient.

The AF System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the AF System support Anticipated Transients Without a Scram, Environmental Qualification, Fire Protection, and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the AF System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the AF System subject to an AMR extend from condensate storage tank and the cooling water header supply connection points to the main feedwater piping location near the steam generator inlet and include the pumps, piping and valves.

System Function Listing

A comprehensive listing of functions associated with the AF System, or specific components contained in the system, is provided in the summary below.

Code AF-01	Cri 1	Cri 2	Cri 3				
Provides feedwater to the steam generators for heat removal from the RC System during and following design basis events.			FP	EQ	PTS	AT	SB
	X						

Comment: Delivers feedwater from the condensate storage tank or from the CL System to the steam generators to remove residual heat from the RC System, prevent thermal cycles of the steam generator tube sheet and maintain a head of water in the steam generators.

Code AF-02	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon to perform a Primary Containment Boundary Function.			FP	EQ	PTS	AT	SB
	X						

Comment: The AF System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code AF-03	Cri 1	Cri 2	Cri 3				
Provides feedwater to the steam generators for heat removal from the RC System during normal plant conditions.			FP	EQ	PTS	AT	SB

Comment: If the main FW System is inoperable or its flow is too great, steam generator levels are controlled by operation of the AF System. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code AF-04	Cri 1	Cri 2	Cri 3				
May be used for injection of chemicals from the Chemical Feed sub-system to provide secondary chemistry control.			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code AF-AT	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.62, Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: The AF System provides an AFWP actuation function initiated from a diverse start signal from the AMSAC/DSS System in support of the ATWS event. The AFWP circuit provides the signal to isolate Steam Generator Blowdown.

Code AF-EQ	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: This system contains equipment listed on the EQ Master List that is important to safety and is required to perform its safety related function when exposed to a worst case post accident environment.

Code AF-FP	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: This system contains required equipment that performs a Fire Protection Safe Shutdown Decay Heat Removal function.

Code AF-NSAS	Cri 1	Cri 2	Cri 3				
Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The AF System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code AF-SB	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout			FP	EQ	PTS	AT	SB
							X

Comment: The AF System performs secondary side heat removal by providing auxiliary feedwater to the steam generators for coping with the SBO event and forms part of the Containment isolation boundary which supports the SBO Containment isolation functional requirement.

USAR Reference

Additional AF System details are provided in Section 1.3.9, Section 11.1.1, Section 11.9, Figure 11.1-5, and Figure 11.1-6 of the USAR.

License Renewal Drawings

The License Renewal drawings for the AF System are listed below:

Common	Unit 1	Unit 2
None	LR-39222	LR-39223

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.4-1 along with each component's intended function(s).

Table 2.3.4-1 Auxiliary Feedwater System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
FILTER/STRAINER ELEMENTS	FILTER
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	HEAT TRANSFER PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY THROTTLE
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
TURBINE CASINGS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.4.2 Bleed Steam System

System Description

The Bleed Steam (BL) System is a steam and power conversion system that is designed to improve turbine cycle efficiency by using turbine exhaust steam for feedwater heating. The BL System includes the Heater Vents sub-system. The BL System is an operating system.

The BL System for each PINGP Unit consists of the necessary piping, valves and instrumentation for supplying turbine exhaust steam to the feedwater heaters for feedwater heating. Steam from five extraction points in the turbine casings is piped to the shells of the two parallel strings of feedwater heaters. To prevent turbine overspeed from backflow of flashed condensate from the heaters after a turbine trip, non-return valves are provided in the high pressure turbine extraction lines. The BL System also provides steam to the HS System. The Heater Vent sub-system consists of the necessary piping and valves, designed to provide venting of the feedwater heaters to ensure maximum thermal and hydraulic efficiency and minimize corrosion within the components.

Portions of the BL System are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). The portions of the BL System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the BL System containing components subject to an AMR extend from the steam turbine to the feedwater heaters, along with the vent lines to the condenser, and include the piping and valves.

System Function Listing

A comprehensive listing of functions associated with the BL System, or specific components contained in the system, is provided in the summary below.

Code BL-01 Provides steam to the shells of the feedwater heaters.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The BL System improves turbine cycle efficiency by supplying turbine exhaust steam to the feedwater heaters for feedwater heating. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code BL-02 Provides steam to the HS System.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The HS System provides steam for heating main plant buildings, operation of the boric acid and waste evaporators and the boric acid batching tank, and also supplies an alternate source of steam for the hoggers, air ejectors, Gland Sealing Steam sub-system, and the water box air ejectors. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code BL-03 The Heater Vent sub-system provides continuous venting of the feedwater heaters.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Continuous venting of the system components ensures maximum thermal and hydraulic efficiency and minimizes corrosion within the components. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code BL-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The BL System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

USAR Reference

Additional BL System details are provided in Section 11.7 of the USAR.

License Renewal Drawings

The License Renewal drawings for the BL System are listed below:

Common	Unit 1	Unit 2
None	LR-39224	LR-39225

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.4-2 along with each component's intended function(s).

Table 2.3.4-2 Bleed Steam System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.4.3 Circulating Water System

System Description

The Circulating Water (CW) System is a steam and power conversion system that provides the heat sink for the generating plant. In addition, the CW System supplies water to the CL System and the FP System and provides a means of back flushing the Emergency Cooling Water (CL) Intake Line. The CW System includes the External and Internal Circulating Water sub-systems, the Screen Wash sub-system, the Condenser Tube Cleaning sub-system and the Condenser Water Box Vent and Drain sub-system. The CW System and sub-systems are considered an operating system.

The External and Internal CW System for each PINGP Unit consists of two pumps and the necessary piping, valves and instrumentation. The remaining components are shared by Units 1 and 2, and include trash racks, pumps, traveling screens, control gates, sluice gates, four cooling towers, four cooling tower pumps and the necessary piping, valves and instrumentation. Also included are the miscellaneous sub-systems in the various CW System buildings including De-Ice Equipment, Wells, Ventilation, Service Air, Heaters, etc. The system is designed to take water from the Mississippi River through the Intake Screenhouse to the Intake Canal and into the Plant Screenhouse. Trash racks and traveling water screens located in the Intake Screenhouse collect fish, fish larvae and debris from the intake stream and return these organisms to the river to prevent them from entering plant systems. Bypass gates are provided to support normal plant operation in the case the screens become blocked. Trash racks and traveling screens located in the Plant Screenhouse provide a second screening of the water prior to being pumped through the condenser tubes where excess heat from the steam leaving the turbine is transferred to the water. Based on seasonal limitations heat is transferred to the environment either by the use of the cooling towers, discharge to the river, or a combination of both. A Screen Wash sub-system located in the Plant Screenhouse provides water for washing debris off the plant screens. The screen wash supply is provided by a pump which can be aligned to pump into the Fire Water sub-system and is evaluated with the FP System.

CL and FP pumps draw water from behind the Plant Screenhouse screens. During emergency operation, when the circulating water pumps are not in-service, the flows through the screens would be insignificant and plugging or failure of the screens is not credible. In addition, the safety related CL pumps are provided with a supply that bypasses the non-safety related trash racks and screens. Therefore, Intake Screenhouse components and the Plant Screenhouse trash racks and screens are not relied upon to perform or support a License Renewal intended function.

The Condenser Tube Cleaning sub-system for each PINGP Unit consists of a ball collector, distributors, strainer sections, pumps and the necessary piping, valves and instrumentation designed to recirculate sponge rubber balls through the condenser tubes to clean silt, scale and organic matter out of the tubes, helping to maintain maximum heat transfer conditions and improve plant efficiency. The Condenser Water Box Vent and Drain sub-system for each PINGP Unit consists of an ejector, vacuum tank and the necessary piping, valves and instrumentation designed to ensure the water boxes are vented and provides a means of draining the water boxes.

Portions of the CW System are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). The portions of the CW System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the CW System containing components subject to an AMR begin at the circulating water pumps and extend to the point where the circulating water piping exits the Turbine Building and include the condenser water boxes, piping and valves. The portions of the Condenser Tube Cleaning sub-system containing components subject to AMR begin at the strainer connection pipes and extend to the distributors and include the ball collectors, pumps, piping and valves. The portions of the Condenser Water Box Vent and Drain sub-system containing components subject to an AMR begin at the water box and extend to the ejector and drains and include the tanks, piping and valves.

System Function Listing

A comprehensive listing of functions associated with the CW System, or specific components contained in the system, is provided in the summary below.

Code CW-01 Provides the heat sink for the generating plant. The CW System includes the Internal and External Circulating Water sub-systems.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Excess heat from the steam leaving the turbine or steam dumped to the condenser during low power, is transferred to the circulating water. Based on seasonal limitations, heat is then transferred to the environment either by the use of the cooling towers, discharge to the river, or a combination of both. This function does not meet the criteria listed in 10 CFR54.4(a)(1), (2) or (3).

Code CW-02 Supplies water to the CL and the FP Systems.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Water flows from the intake bay through the trash racks and screens into the plant Screenhouse. Cooling Water and Fire Protection pumps draw water from behind the screens. During emergency operation, when the circulating water pumps are not in-service, the flows through the screens would be insignificant and therefore the screens do not support an intended function. In addition, the safety related CL pumps are provided with a supply that bypasses the trash racks and screens. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CW-03 Provides a means of back flushing the Emergency Cooling Water (CL) Intake Line.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The discharge of the circulating water pumps can be aligned for back flushing the Emergency Cooling Water Intake line and crib. This function does not meet the criteria listed in 10 CFR54.4(a)(1), (2) or (3).

Code CW-04 The Condenser Tube Cleaning sub-system keeps the condenser tubes clean to ensure adequate heat transfer.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CW-05 The Condenser Water Box Vent and Drain sub-system ensures the water boxes are vented and provides a means of draining the water boxes.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CW-06 The Screen Wash sub-system provides water for washing debris off the circulating water screens.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The Screen Wash supply is provided by a pump which can be aligned to pump into the Fire Water sub-system and is evaluated with the FP System. The screen wash function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CW-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The CW System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions, including flooding, that could cause failure of safety related components.

USAR Reference

Additional CW System details are provided in Section 2.9.3, Section 10.4.1.2.2, Section 11.5, Figure 10.3-1, Figure 11.1-16 and Figure 11.1-17 of the USAR.

License Renewal Drawings

The License Renewal drawings for the CW System are listed below:

Common	Unit 1	Unit 2
LR-39215-1	None	None

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.4-3 along with each component's intended function(s).

Table 2.3.4-3 Circulating Water System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY

Table 2.3.4-3 Circulating Water System

Components	Intended Function
EDUCTORS	PRESSURE BOUNDARY
EXPANSION JOINTS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
SIGHT GLASSES	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.4.4 **Condensate System**

System Description

The Condensate (CD) System is a steam and power conversion system that is designed to remove condensate from the hotwell of the condenser and supply the FW System for heat removal from the RC System at all load conditions. The CD System condensate storage tanks provide the normal source of water to the AF System for heat removal from the RC System during accident and normal plant conditions. The CD System includes the Condensate Polishing, Chemical Feed, Gland Seal Water, and Heater Drain sub-systems. The CD System is an operating system.

The CD System for each Unit consists of the three condensate pumps, two parallel trains of feedwater heaters, drain coolers, turbine auxiliary component condensers, and the necessary piping, valves and instrumentation. Steam exhausted from the low pressure turbines is condensed in the main condenser and drains to the condenser hotwells. Three condensate pumps take suction on the hotwells through a common header. The pumps discharge to a common header which directs the condensate flow through the air ejector condenser and the gland steam condenser and into two parallel trains of feedwater heaters before flowing to the suction of the main feedwater pumps. Three condensate storage tanks are provided for the two Units; the tanks supply normal and emergency makeup to each Unit's CD System and provides water to each Unit's auxiliary feedwater pumps. The safety related (backup) source of water to the auxiliary feedwater pumps is provided by the CL System.

The Heater Drain sub-system for each Unit consists of a drain tank, three heater drain pumps and the necessary piping, valves and instrumentation designed to collect drainage from the CD and FW Systems and supply it to the FW System. The arrangement of feedwater heaters and heater drains increases overall plant efficiency.

The Condensate Polishing sub-system for each Unit consists of three filter/demineralizers, tanks, pumps, filters, and the necessary piping, valves and instrumentation, designed to remove suspended and dissolved impurities from the condensate. The system is typically used during Unit start-up. The equipment provided for processing of waste solids generated during the condensate polishing process is shared by Units 1 and 2 and consists of filters, tanks and the necessary piping, valves and instrumentation designed to dewater the spent resin for disposal.

The Chemical Feed sub-system for each Unit consists of tanks, pumps and the necessary piping, valves and instrumentation designed to supply chemicals to the FW System and steam generators during normal operation for oxygen and chemistry control. Check valves at the boundary between the Chemical Feed sub-system and the AF System ensure the AF System fulfills its function by preventing backflow from the AF System into the Chemical Feed sub-system.

The Gland Seal Water sub-system for each Unit consists of filters and the necessary piping, valves and instrumentation designed to provide gland seal water to condensate, feedwater and heater drain pumps.

Portions of the CD System are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the CD System support Fire Protection and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the CD System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the CD System and Condensate Polishing sub-system containing components subject to an AMR begin at the main condenser and condensate storage tanks and extend to the FW and AF Systems and include the feedwater heaters, filter/demineralizers, pumps, tanks, piping and valves. The portions of the Chemical Feed sub-system containing components subject to an AMR begin at the feed tanks and extend to the process piping and include the pumps, piping and valves. The portions of the Gland Seal sub-system containing components subject to an AMR begin at the discharge of the condensate pumps extending to the condensate, heater drain, and feedwater pumps and back to the condenser and include the piping and valves. The portions of the Heater Drain sub-system containing components subject to an AMR begin at the drain connections and extend to the FW System and include the tanks, pumps, piping and valves.

System Function Listing

A comprehensive listing of functions associated with the CD System, or specific components contained in the system, is provided in the summary below.

Code CD-01 Provide the normal source of water to the AF System for heat removal from the Reactor Coolant System during accident and normal plant conditions.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The condensate storage tanks provide the normal source of water to the AF System. The Safety Related (backup) source of water is provided by the CL System. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CD-02 Provide water to the FW System for heat removal from the RC System during normal plant conditions.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The CD System removes condensate from the hotwell of the condenser and supplies the FW System at all load conditions. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CD-03 The Chemical Feed sub-system provides secondary chemistry control.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CD-04 The Gland Seal Water sub-system provides gland seal water for pumps.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The Gland Seal Water sub-system provides gland seal water to the condensate, feedwater, and heater drain pumps. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CD-05	Cri 1	Cri 2	Cri 3				
The Condensate Polishing sub-system is designed to remove suspended and dissolved impurities from the condensate and provide storage, handling and processing of waste solids generated during the condensate polishing process.			FP	EQ	PTS	AT	SB

Comment: The Condensate Polishing sub-system is typically used during start-up to maintain secondary chemistry within specified limits. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CD-06	Cri 1	Cri 2	Cri 3				
The Heater Drain sub-system provides water to the FW System for heat removal from the Reactor Coolant System during normal plant conditions.			FP	EQ	PTS	AT	SB

Comment: The Heater Drain sub-system collects drainage from the CD and FW Systems and supplies the FW System at all load conditions. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code CD-FP	Cri 1	Cri 2	Cri 3				
Contains SSC relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: The CD System contains required equipment that performs a Fire Protection Safe Shutdown Decay Heat Removal function and contains associated circuits of concern related to the Fire Protection Safe Shutdown Decay Heat Removal function.

Code CD-NSAS	Cri 1	Cri 2	Cri 3				
Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The CD System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

Code CD-SB	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.			FP	EQ	PTS	AT	SB
							X

Comment: The condensate storage tanks and attached pressure boundary piping provide the water source for the AF System supply to the steam generators for secondary side heat removal in support of coping with the SBO event.

USAR Reference

Additional CD System details are provided in Section 11.3, Section 11.8, and Section 11.9 of the USAR.

License Renewal Drawings

The License Renewal drawings for the CD System are listed below:

Common	Unit 1	Unit 2
LR-39240-1	LR-39220	LR-39221
LR-39253-1	LR-39226	LR-39227
LR-39253-2	LR-39239	LR-39240
	LR-XH-2000-9	LR-XH-2000-10

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.4-4 along with each component's intended function(s).

Table 2.3.4-4 Condensate System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
DEMINERALIZERS	PRESSURE BOUNDARY
EXPANSION JOINTS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
FLEX CONNECTIONS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
SIGHT GLASSES	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.4.5 Feedwater System

System Description

The main Feedwater (FW) System is a steam and power conversion system designed to provide feedwater to the steam generators for heat removal from the reactor coolant system during normal plant conditions, producing steam for use in the turbine-generator. The FW System is an operating system.

The FW System for each PINGP Unit consists of two motor-driven main feedwater pumps, heaters, flow nozzles and the necessary piping, valves and instrumentation. The FW System increases the pressure of the condensate for delivery through one stage of feedwater heating and the feedwater regulating valves to the steam generators. Each FW header contains a flow meter, a main feedwater regulating valve, a bypass valve and an isolation valve. Even temperature of FW to the SGs is accomplished by the feedwater mixing in the common portions of the headers.

The FW System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the FW System support Anticipated Transients without Scram, Environmental Qualification, Fire Protection, and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the FW System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the FW System containing components subject to an AMR begin at the FW pumps and extend through the heaters and regulating valves to the steam generators.

System Function Listing

A comprehensive listing of functions associated with the FW System, or specific components contained in the system, is provided in the summary below.

Code FW-01 Contains SCs relied upon to perform a Primary Containment Boundary Function.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The FW System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code FW-02 To provide isolation of feedwater flow to the steam generators under certain conditions.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The FW System provides for isolation of the control valves on abnormally high steam generator level, a safety injection signal or a reactor trip in coincidence with a low Tavg.

Code FW-03	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Provides feedwater to the steam generators for heat removal from the RC System during normal plant conditions.							

Comment: The FW System is designed to remove heat from the reactor coolant in the two steam generators, producing steam for use in the turbine generator. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code FW-EQ	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.				X			

Comment: The FW System contains required components listed in the EQ Master List that are important to safety and are required to perform their safety related function when exposed to a worst case post accident environment.

Code FW-FP	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			X				

Comment: This system contains associated circuits of concern related to the Fire Protection Safe Shutdown Decay Heat Removal function.

Code FW-NSAS	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.		X					

Comment: The FW System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions, including HELB and flooding, that could cause failure of safety related components.

Code FW-SB	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.							X

Comment: The FW System contains required equipment that forms part of the pressure boundary with the MS and AF Systems which support coping for the SBO event through support of secondary side heat removal and forms part of the containment isolation boundary which supports the SBO containment isolation functional requirement.

USAR Reference

Additional FW System details are provided in Section 11.9 of the USAR.

License Renewal Drawings

The License Renewal drawings for the FW System are listed below:

Common	Unit 1	Unit 2
None	LR-39222 LR-39222-1	LR-39223 LR-39223-1

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.4-5 along with each component's intended function(s).

Table 2.3.4-5 Feedwater System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
LEADING EDGE FLOW METER (LEFM) TRANSDUCER HOUSINGS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.4.6 Main Steam System

System Description

The Main Steam (MS) System is a steam and power conversion system designed to remove heat from the reactor coolant under accident and normal plant conditions, producing steam for use in the turbine generator. The system can receive and dispose of the total heat existent or produced in the RC System following a turbine generator trip at full load. The MS System is an operating system.

The MS System for each PINGP Unit consists of the necessary piping, valves and instrumentation designed to conduct steam from each of the two steam generators within the reactor Containment through a swing-disc type isolation valve and a swing-disc type non-return valve to the turbine stop and control valves. The main steam isolation valves serve to limit an excessive RC System cooldown rate and resultant reactivity insertion following a main steam break incident. A steam flow nozzle is provided in the line from each steam generator upstream of the isolation and non-return valves, to meter steam flow from each steam generator and to limit the rate of steam release in the event of a main steam line break. The steam for the turbine-driven auxiliary feedwater pump is obtained from both main steam lines, upstream of the main steam isolation valves.

Main steam for the turbine gland seal steam supply, air ejectors, reheater section of the four moisture separator reheaters, and the priming ejector, is obtained from branches on the main steam lines ahead of the turbine stop valves. Two steam dump flow paths, condenser steam dump and the atmospheric steam dump, are available to remove energy from the steam generators.

The MS System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the MS System support Environmental Qualification, Fire Protection, and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the MS System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the MS System subject to an AMR extend from the steam generator nozzles, including the steam generator level control instrumentation, and continue to the various components the system supplies such as the AF pump turbine, main turbine, moisture separators, etc., including the code safety, power operated relief and steam dump valves, and the associated piping, valves and instrumentation.

System Function Listing

A comprehensive listing of functions associated with the MS System, or specific components contained in the system, is provided in the summary below.

Code MS-01 Provide heat removal from the RC System during and following design-basis events.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The MS System incorporates normal (condenser and atmospheric steam dumps) and backup (power operated relief valves and code safety valves) means for heat removal to accommodate reactor shutdown heat rejection requirements.

Code MS-02 Provide for main steam line isolation.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The MS System incorporates a main steam isolation valve (MSIV) and non-return valve in series in each MS line. Hence, failure of either valve will not permit the blowdown of more than one steam generator. The MSIVs limit an excessive reactor cooldown rate and reactivity insertion following a main steam break incident.

Code MS-03 Provide steam to the turbine-driven auxiliary feedwater pump.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The MS System provides steam to the turbine driven auxiliary feedwater pump to provide the required flow of feedwater to the steam generators.

Code MS-04 Contains SCs relied upon to perform a Primary Containment Boundary Function.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The MS System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code MS-05 Provide heat removal from the RC System during normal conditions	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The MS System provides steam for use in the turbine generator or the two steam dump systems. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code MS-06 Contains components that provide input to the reactor protection and engineered safeguards features equipment.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The instrumentation provided ensures safe and orderly operation of all systems and processes over the full operating range of the plant.

Code MS-AT Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.62, Anticipated Transients Without Scram	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
						X	

Comment: The MS System contains the wide Range Steam Generator Level transmitters which provide input signals to the AMSAC/DSS System to produce the actuation signals to support the ATWS event.

Code MS-EQ Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
				X			

Comment: The MS System contains required components listed in the EQ Master List that are important to safety and are required to perform their safety related function when exposed to a worst case post accident environment.

Code MS-FP Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: The MS System contains required equipment that performs a Fire Protection Safe Shutdown Decay Heat Removal function and contains associated circuits of concern related to the Fire Protection Safe Shutdown Decay Heat Removal function.

Code MS-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The MS System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions, including HELB and flooding, that could cause failure of safety related components.

Code MS-SB Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: The MS System supports coping for the SBO event through support of secondary side heat removal and forms part of the Containment isolation boundary which supports the SBO Containment isolation functional requirement. The heat removal function is performed by steam relief from the steam generators and by providing the steam supply for the turbine-driven auxiliary feedwater pump.

USAR Reference

Additional MS System details are provided in Section 11.1, Section 11.4, Section 11.7, and Section 14.5.4 of the USAR.

License Renewal Drawings

The License Renewal drawings for the MS System are listed below:

Common	Unit 1	Unit 2
None	LR-39218	LR-39219

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.4-6 along with each component's intended function(s).

Table 2.3.4-6 Main Steam System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY THROTTLE
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.4.7 Steam Generator Blowdown System

System Description

The Steam Generator Blowdown (SB) System is a steam and power conversion system designed to remove chemical and particulate impurities from the steam generators and maintain chemical levels in the steam generators within acceptable range. The SB System is an operating system.

The SB System for each PINGP Unit consists of a flash tank, heat exchangers, filters and transfer pump and the associated piping, valves and instrumentation. The SB System processes steam generator blowdown water. The system is continuously monitored by a process radiation monitor that detects any radioactivity which may have leaked into the steam generators from the primary system. Blowdown water is normally routed for feedwater heating and then to the WD System for further processing. This water may also be released to the circulating water discharge canal via a radiation monitor as is the case during Unit startup. In the event that radioactivity levels exceed the setpoint of the SB System radiation monitor to the discharge canal, the corresponding discharge valve automatically closes thus securing the release. The steam from the blowdown flash tank is normally routed to the extraction steam inlet to feedwater heater No. 3. Steam can also be routed to the main condenser or to the atmosphere.

The SB System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the SB System support Anticipated Transients without SCRAM, Environmental Qualification, Fire Protection, and Station Blackout event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the SB System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the SB System subject to an AMR extend from the steam generators to the main condenser, feedwater heater No. 3, steam generator blowdown hold-up tanks and up to the point where the discharge line exits the Auxiliary Building to the discharge canal.

System Function Listing

A comprehensive listing of functions associated with the SB System, or specific components contained in the system, is provided in the summary below.

Code SB-01 Contains SCs relied upon to perform a Primary Containment Boundary Function.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The SB System contains required components that perform a Primary Containment Boundary or Isolation Function designed to confine radioactive materials.

Code SB-02 Maintain steam generator water chemistry.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The SB System maintains chemical levels in the steam generators within acceptable range and removes chemical and particulate impurities from the steam generators. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code SB-03 Provides for draining the SGs, layup, and chemistry control.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The SB System is also used during outages for draining the SG and providing recirc connections for shutdown lay-up and chemistry control. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code SB-AT Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.62, Anticipated Transients Without Scram.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
						X	

Comment: The SB System provides the actuation of Steam Generator Blowdown Isolation from the AMSAC/DSS System via the AF System to support the ATWS event.

Code SB-EQ Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
				X			

Comment: The SB System contains required components listed in the EQ Master List that are important to safety and are required to perform their safety related function when exposed to a worst case post accident environment.

Code SB-FP	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: The SB System contains associated circuits of concern related to the Fire Protection Safe Shutdown Decay Heat Removal function.

Code SB-NSAS	Cri 1	Cri 2	Cri 3				
Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The SB System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions, including HELB and flooding, that could cause failure of safety related components.

Code SB-SB	Cri 1	Cri 2	Cri 3				
Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.			FP	EQ	PTS	AT	SB
							X

Comment: PINGP systems which form part of the containment isolation boundary are in scope for License Renewal to support the SBO containment isolation functional requirement.

USAR Reference

Additional SB System details are provided in Section 4.3.2, Section 7.5.2 and Section 9.2.2 of the USAR.

License Renewal Drawings

The License Renewal drawings for the SB System are listed below:

Common	Unit 1	Unit 2
LR-39250	None	None
LR-88740		

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.4-2 along with each component's intended function(s).

Table 2.3.4-7 Steam Generator Blowdown System

Components	Intended Function
BOLTING/FASTENERS	PRESSURE BOUNDARY
EXPANSION JOINTS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.4.8 Turbine Generator and Support System

System Description

The Turbine Generator and Support (TB) System is a steam and power conversion system that provides heat removal from the RC System during normal operation and the production of electricity. The system includes the Air Removal, Electro-Hydraulic Control, Gland Sealing Steam, Miscellaneous Drains and Vents, Turbine Building Traps and Drains, Turbine Oil, Turbine and Turbine Moisture Separator sub-systems. The TB System and sub-systems are operating systems.

The TB System for each PINGP Unit consists of the turbine generators, including the Electro-Hydraulic Control, Gland Sealing Steam, Turbine, Turbine Moisture Separator and Turbine Oil sub-systems, turning gear, cylinder heating, hydrogen cooling, tanks, heat exchangers, pumps and the necessary piping, valves and instrumentation. The various turbine auxiliaries support turbine generator operation by providing necessary controls, sealing steam, stop oil, lubrication oil, seal oil, cylinder heating and hydrogen cooling. Control, stop, reheat stop and intercept valves are provided to control and shut-off the flow of steam to the turbine in the event the unit overspeeds.

The Air Removal sub-system for each PINGP Unit consists of three steam-jet air ejectors, condensers, hogging ejectors and the necessary piping, valves and instrumentation designed to evacuate and maintain a vacuum in the condenser. The Miscellaneous Drains and Vents and the Turbine Building

Traps and Drains sub-systems for each PINGP Unit consist of traps, sumps and the necessary piping, valves and instrumentation designed to provide vent and drain paths and sump accumulation for secondary side components.

The TB System is within the scope of License Renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety related affecting safety related components for structural integrity and/or spatial interaction based on the criteria of 10 CFR 54.4(a)(2). Portions of the TB System support Anticipated Transients without Scram and Fire Protection event requirements based on the criteria of 10 CFR 54.4(a)(3). The portions of the TB System within the scope of License Renewal are shown on the License Renewal Boundary Drawings.

The portions of the TB System containing components subject to an AMR begin at the control valves and extend to the condenser and include the turbines casings, moisture-separator re-heater assemblies, oil reservoirs, heat exchangers, pumps, piping, valves and instrumentation.

System Function Listing

A comprehensive listing of functions associated with the TB System, or specific components contained in the system, is provided in the summary below.

Code TB-01	Cri 1	Cri 2	Cri 3				
Provide heat removal from the RC System during normal operation and the production of electricity.			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code TB-02	Cri 1	Cri 2	Cri 3				
The Air Removal sub-system maintains a vacuum in the condenser.			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code TB-03	Cri 1	Cri 2	Cri 3				
The Miscellaneous Drains and Vents and the Turbine Building Traps and Drains sub-systems provide vent and drain paths and sump accumulation for secondary side components.			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code TB-04	Cri 1	Cri 2	Cri 3				
Turbine Building Traps and Drains sub-system components provide a MS System and turbine driven auxiliary feedwater pump steam supply safety related pressure boundary function.			FP	EQ	PTS	AT	SB
	X						

Comment: This function meets the criteria listed in 10CFR 54.4(a)(1).

Code TB-05	Cri 1	Cri 2	Cri 3				
The Electro-Hydraulic Control sub-system operates the turbine control valves and stop, reheat stop and intercept valves.			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code TB-06	Cri 1	Cri 2	Cri 3				
The Gland Sealing Steam sub-system seals the turbine shaft and prevents leakage of steam into the turbine room.			FP	EQ	PTS	AT	SB

Comment: Gland sealing steam and air leakage along the shaft at each turbine gland is fed to a condenser, thus preventing any leakage of steam into the turbine room. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code TB-07	Cri 1	Cri 2	Cri 3				
The Turbine Oil sub-system stores, purifies and supplies all of the oil required for the emergency trip and lubrication during normal operation.			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code TB-08	Cri 1	Cri 2	Cri 3				
Contains components that provide input to the reactor protection and engineered safeguards features equipment.			FP	EQ	PTS	AT	SB
	X						

Comment: The instrumentation provided ensures safe and orderly operation of systems and processes over the full operating range of the plant.

Code TB-09	Cri 1	Cri 2	Cri 3				
The Turbine sub-system converts the heat energy of steam generated in the RC System into mechanical energy which is then transferred to the main generator for conversion into electrical energy.			FP	EQ	PTS	AT	SB

Comment: This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code TB-10 The Turbine Moisture Separator sub-system removes moisture and then superheats the steam prior to entering the low pressure turbines.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: In the Turbine Moisture Separators, moisture is removed from the steam in the separator region and then the steam is superheated using main steam in the reheater section. This function does not meet the criteria listed in 10 CFR 54.4(a)(1), (2) or (3).

Code TB-AT Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.62, Anticipated Transients Without Scram.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
						X	

Comment: The AMSAC/DSS System provides a Turbine Trip signal to the TB System to stop steam flow to the turbine. This reduces the steam production to be within the capabilities of the AF System in support of the ATWS event.

Code TB-FP Contains SCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: The TB System contains associated circuits of concern related to the Fire Protection Safe Shutdown Decay Heat Removal function.

Code TB-NSAS Contains non-safety related SCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The TB System contains non-safety related components that maintain mechanical and structural integrity to provide structural support to attached safety related piping or to prevent spatial interactions that could cause failure of safety related components.

USAR Reference

Additional TB System details are provided in Section 11.1, Section 11.2, Section 11.3.2, Figure 11.1-12, and Figure 11.1-13 of the USAR.

License Renewal Drawings

The License Renewal drawings for the TB System are listed below:

Common	Unit 1	Unit 2
LR-39230	LR-107229-1	LR-107229
	LR-39231-1	LR-39231-2
	LR-39233	LR-39234
	LR-XH-2-15	LR-XH-1002-43
	LR-XH-2-16	LR-XH-1002-44
	LR-XH-2-16A	LR-XH-1002-45

Components Subject to an AMR

The components for this system that require an AMR are addressed in Table 2.3.4-8 along with each component's intended function(s).

Table 2.3.4-8 Turbine Generator and Support System

Components	Intended Function
BLOWERS	PRESSURE BOUNDARY
BOLTING/FASTENERS	PRESSURE BOUNDARY
EDUCTORS	PRESSURE BOUNDARY
FILTER/STRAINER HOUSINGS	PRESSURE BOUNDARY
FLEX CONNECTIONS	PRESSURE BOUNDARY
HEAT EXCHANGER COMPONENTS	PRESSURE BOUNDARY
HEAT EXCHANGER TUBES	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING/FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
RUPTURE DISCS	PRESSURE BOUNDARY
SIGHT GLASSES	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
TRAPS	PRESSURE BOUNDARY
TURBINE CASINGS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.4 Scoping and Screening Results: Containments, Structures, and Component Supports

The following structures and structural components are addressed in this section:

- Auxiliary and Turbine Buildings (Section 2.4.1)
- Component Supports (Section 2.4.2)
- Cranes, Heavy Loads, Fuel Handling (Section 2.4.3)
- D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building (Section 2.4.4)
- Fire Protection Barriers (Section 2.4.5)
- Radwaste Building, Old Administration Building, and Administration Building Addition (Section 2.4.6)
- Reactor Containment Vessels Units 1 and 2 (Section 2.4.7)
- SBO Yard Structures (Section 2.4.8)
- Shield Buildings Units 1 and 2 (Section 2.4.9)
- Tank Foundations (Section 2.4.10)
- Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse (Section 2.4.11)

2.4.1 Auxiliary and Turbine Buildings

Description

Auxiliary Building

The Auxiliary Building is a multi-level reinforced concrete and steel framed structure built on a mat foundation. It is an integral part of the power house complex, and houses both safety related and non-safety related SSCs. The building’s mat foundation has structural continuity with the foundations of the Turbine Building and Shield Buildings. Construction joints divide the foundation into individual building mats. The mat varies in thickness with location from a minimum of three to a maximum of approximately six feet, and is poured on a 4" mud mat and waterproofing membrane founded on engineered fill. Top foundation is at elevation 693'-0" finished with an additional two feet of unreinforced concrete used for the placement of embedded items. Above the foundation the Auxiliary Building is not structurally attached to other buildings except at column rows G and H where concrete walls provide vertical and lateral support to the Turbine Building's structural steel frame. The Turbine Building and Radwaste Building are respectively north and south of the Auxiliary Building, while the Units 1 and 2 Shield Buildings form a portion of its east and west boundaries. USAR Section 12.2 refers to the Old Service Building as an individual structure, separate from the Auxiliary Building even though both buildings share the same foundation between column rows 1 and 3. In order to align with the USAR, this area of the Auxiliary Building will be considered the Old Service Building and evaluated separately. The Old Service Building houses the D1/D2 diesel generator rooms and associated equipment.

The mat foundation, reinforced concrete structure above the foundation, main load carrying structural steel frame, and the auxiliary building crane support steel are safety related. The reinforced concrete structure acts as secondary containment and provides shelter and protection for safety related SSCs. The structural steel frame provides shelter and protection for the auxiliary building crane and portions of the safety related concrete structure. It is located above and supported by the concrete structure and mat foundation.

Safety related and non-safety related SSCs of the Auxiliary Building include,

- Spent fuel pools and fuel transfer tubes,
- New fuel pit,
- Spent fuel pool bridge crane,
- Auxiliary building crane,
- Ventilation systems,
- Radwaste storage,
- Control room,
- Relay room (i.e. cable spreading room),
- Computer room,
- Various chemistry labs,
- Sumps and pits,
- Engineered safeguards systems, and
- Refueling water storage tanks.

Auxiliary Building structures that are non-safety related include building secondary members, steel siding, and others.

In addition to concrete and steel materials used in construction, the Auxiliary Building also includes aluminum (covers over concrete roof plugs), masonry walls, and wood planking located at the bottom of the new fuel storage pit.

<u>Turbine Building</u>

The Turbine Building is a multi-level reinforced concrete structure and steel framed structure built on a mat foundation housing safety related and non-safety related SSCs. It is located adjacent to, and north of the Auxiliary Building.

The Turbine Building's reinforced concrete mat foundation varies from three to five feet thick and is poured on a 4" mud mat and waterproofing membrane resting on engineered fill. The top of the mat foundation is at elevation 693'-0" and finished with an additional two feet of unreinforced concrete used for the placement of embedded items. The building's mat foundation has structural continuity with the foundations of the Auxiliary Building and Shield Buildings, and is divided into the individual building mats by construction joints. Above the foundation the Turbine Building is not structurally attached to other buildings except at column rows G and H where Auxiliary Building concrete walls provide vertical and lateral support to the Turbine Building's structural steel frame.

The safety related portions of the Turbine Building include the reinforced concrete aisle, the Turbine Building main load carrying structural steel frame, and the Turbine Building crane structural steel support members. The reinforced concrete aisle forms an enclosure that houses safety related components and is located at the 695'-0" elevation of the Turbine Building resting on its mat foundation. It is centrally located within the Turbine Building, approximately 55 feet in width, and spans the entire width of the Turbine Building in the north-south direction. The top slab of the enclosure varies from elevation 715'-0" to 735'-0". The Turbine Building's reinforced concrete aisle provides shelter and protection for plant equipment such as:

- 480V and 4160V safeguards switchgear (mezzanine floor)
- Auxiliary Feedwater System pumps
- Air compressors
- Batteries
- Cooling water pipes

Safety related masonry walls can be found within the concrete aisle.

The structural steel frame provides shelter and protection for the reinforced concrete aisle. It is located above and supported by the mat foundation and the Auxiliary Building column row G concrete wall. The structural steel frame also provides a weatherproof enclosure for other SSCs and provides support for the turbine building crane.

Non-safety related components of the Turbine Building include secondary members, turbine generator foundation, steel siding, and others.

Level transmitters 1LT-723 and 1LT-724 for condensate storage tanks #11, #21, and #22 are safety related components located in the Turbine Building accessible at ground floor elevation 695'-0". These components are protected by the Turbine Building mezzanine floor steel and concrete floor above.

Since the safety related aisle is resting on the mat foundation, and since the foundation and concrete walls provide flood protection, the entire mat foundation, reinforced concrete walls, and reinforced concrete floor slabs are included within the scope of License Renewal.

System Function Listing

A comprehensive listing of functions associated with the Auxiliary and Turbine Buildings, or specific components contained in the structure, is provided in the summary below.

Code AXB-01	Cri 1	Cri 2	Cri 3				
The Auxiliary Building provides structural support to safety related components.			FP	EQ	PTS	AT	SB
	X						

Comment: The Auxiliary Building is designed to provide structural support to safety related components relied upon to remain functional during and following design-basis events to ensure satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

Code AXB-02	Cri 1	Cri 2	Cri 3				
The Auxiliary Building provides flood protection from internal and external flooding events.			FP	EQ	PTS	AT	SB
	X						

Comment: The Auxiliary Building is designed to protect safety related components from the effects of internal and external flooding. Foundation and walls are designed to resist the hydrostatic pressures due to flooding. Construction joints are keyed and provided with waterstops, and the foundation mat is completely enveloped with a waterproof membrane. Openings below the flood level are closed with bulkheads stored on site. Therefore the Auxiliary Building is within the scope of License Renewal per 10 CFR 54.4(a)(1).

Code AXB-03	Cri 1	Cri 2	Cri 3				
The Auxiliary Building provides heat sink during design basis event.			FP	EQ	PTS	AT	SB
	X						

Comment: The Auxiliary Building is designed to protect safety related components from the effects due to HELB. Exposed concrete surface areas act as heat conducting surfaces. Therefore the Auxiliary Building is within the scope of License Renewal per 10 CFR 54.4(a)(1).

Code AXB-04	Cri 1	Cri 2	Cri 3				
The Auxiliary Building provides shielding against high energy line breaks.			FP	EQ	PTS	AT	SB
		X					

Comment: The Auxiliary Building HELB shielding is designed to protect safety related equipment from the effects of a HELB and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(2). HELB shielding may include concrete walls, ceilings and floors, whip restraints, jet impingement shields, masonry walls, doors, etc.

Code AXB-05 The Auxiliary Building provides a missile barrier for externally generated missiles.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The Auxiliary Building provides protection to safety related components from the effects of tornado generated missiles and turbine generator missiles. The structure's design includes reinforced concrete walls, floors, and slabs, and steel structures to withstand the affects of missiles without loss of function.

Code AXB-06 The Auxiliary Building provides shelter and protection to safety related components.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The Auxiliary Building provides shelter and protection to safety related components from the adverse effects of postulated low temperatures, adverse atmosphere, and environmental conditions.

Code AXB-07 The Auxiliary Building provides shielding against radiation.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The Auxiliary Building provides radiation shield concrete walls, ceilings and floors, and other shielding to protect safety related equipment and personnel, and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(1). The Auxiliary Building control room concrete walls, ceilings, and floors in combination with the ventilation system maintain the dose to the control room operator less than the limits specified in 10 CFR 50, Appendix A, GDC 19, for a design basis accident. Additionally walls, ceilings and floors provide protection in a smoke, steam, or toxic gas release event such that the operators can achieve and maintain safe shutdown.

Code AXB-08 The Auxiliary Building provides pressure boundary or essentially leak tight barrier to protect public health and safety in the event of any postulated design basis events.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: Part of the Auxiliary Building provides a secondary containment function. The building is designed to maintain releases within 10 CFR 100 limits, and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(1)(iii). The Auxiliary Building houses and supports components essential for safe shutdown of the reactor and limit the release of radioactivity.

Code AXB-AT	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Auxiliary Building houses, supports, and/or protects equipment required to function in support of an ATWS event.						X	

Comment: The Auxiliary Building houses, supports, and/or protects equipment required to function in support of the ATWS event, and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code AXB-FP	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Auxiliary Building is relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			X				

Comment: The Auxiliary Building houses, supports, and/or protects equipment required to function in support of the FP event. Walls, ceilings, and floors make up fire areas designed to protect Appendix R safe shutdown equipment from a fire. They provide a fire barrier boundary to stop the spread of fire to adjacent fire areas, and therefore the Auxiliary Building is within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code AXB-NSAS	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Auxiliary Building contains non-safety related SSCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.		X					

Comment: The Auxiliary Building provides structural support to non-safety related components whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1), and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(2).

Code AXB-SB	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Auxiliary Building is relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.							X

Comment: The Auxiliary Building houses, supports, and/or protects equipment required to function in support of SBO coping and mitigation and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code TRB-01	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Turbine Building provides structural support to safety related components.	X						

Comment: The Turbine Building is designed to provide structural support to safety related components relied upon to remain functional during and following design-basis events to ensure satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

Code TRB-02	Cri 1	Cri 2	Cri 3				
The Turbine Building provides flood protection from internal and external flooding events.			FP	EQ	PTS	AT	SB
	X						

Comment: The Turbine Building is designed to protect safety related components from the effects of internal and external flooding. The Turbine Building has the capacity to accommodate large internal floods before safety related equipment function would be lost. Foundation and walls are designed to resist the hydrostatic pressures due to flooding. Construction joints are keyed and provided with waterstops, and the foundation mat is completely enveloped with a waterproof membrane. Openings below the flood level are closed with bulkheads stored on site. Therefore the Turbine Building is within the scope of License Renewal per 10 CFR 54.4(a)(1).

Code TRB-03	Cri 1	Cri 2	Cri 3				
The Turbine Building provides a missile barrier for internally and externally generated missiles.			FP	EQ	PTS	AT	SB
	X						

Comment: The Turbine Building provides protection to safety related components from the effects of tornado generated missiles and internally generated turbine generator missiles. The structure's design includes reinforced concrete walls, floors, and slabs, and steel structures to withstand the effects of missiles without loss of function.

Code TRB-04	Cri 1	Cri 2	Cri 3				
The Turbine Building provides shelter and protection to safety related components.			FP	EQ	PTS	AT	SB
	X						

Comment: The Turbine Building provides shelter and protection to safety related components from the adverse effects of postulated low temperatures, adverse atmosphere, and environmental conditions.

Code TRB-AT	Cri 1	Cri 2	Cri 3				
The Turbine Building houses, supports, and/or protects equipment required to function in support of an ATWS event.			FP	EQ	PTS	AT	SB
						X	

Comment: The Turbine Building houses, supports, and/or protects equipment required to function in support of an ATWS event and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code TRB-FP	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Turbine Building is relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			X				

Comment: The Turbine Building houses, supports, and/or protects equipment required to function in support of the FP event. Walls, ceilings, and floors make up fire areas designed to protect Appendix R safe shutdown equipment from a fire. They provide a fire barrier boundary to stop the spread of fire to adjacent fire areas, and therefore the Turbine Building is within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code TRB-NSAS	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Turbine Building contains non-safety related SSCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.		X					

Comment: The Turbine Building provides structural support to non-safety related components whose failure could damage safety related components and prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4 (a)(1) and therefore is within the scope of License Renewal per 10 CFR 54.4 (a)(2).

Code TRB-SB	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Turbine Building is relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.							X

Comment: The Turbine Building houses, supports, and/or protects equipment required to function in support of SBO coping and mitigation and therefore is within the scope of License Renewal per 10 CFR 54.4 (a)(3).

USAR Reference

Additional Auxiliary and Turbine Buildings details are provided in Section 12.2 of the USAR.

License Renewal Drawings

The License Renewal drawing for the Auxiliary and Turbine Buildings is listed below:

Common	Unit 1	Unit 2
LR-193817	None	None

Components/Commodities Subject to an AMR

The components for the Auxiliary and Turbine Buildings that require an AMR are addressed in Table 2.4.1-1 along with each component's intended function(s).

Table 2.4.1-1 Auxiliary and Turbine Buildings

Components	Intended Function
ALUMINUM	SHELTER PROTECTION
CERAMIC	PRESSURE RELIEF
CONCRETE	DIRECT FLOW FIRE BARRIER FLOOD BARRIER HELB SHIELDING MISSILE BARRIER SHELTER PROTECTION SHIELDING STRUCTURAL SUPPORT
ELASTOMERS	EXPANSION/SEPARATION FLOOD BARRIER SHELTER PROTECTION
MASONRY WALLS	FIRE BARRIER FLOOD BARRIER HELB SHIELDING MISSILE BARRIER SHIELDING STRUCTURAL SUPPORT
ROOFING	SHELTER PROTECTION
STAINLESS STEEL COMPONENTS	DIRECT FLOW FLOOD BARRIER SHELTER PROTECTION SHIELDING STRUCTURAL SUPPORT

Table 2.4.1-1 Auxiliary and Turbine Buildings

Components	Intended Function
STEEL COMPONENTS	DIRECT FLOW FLOOD BARRIER GASEOUS RELEASE PATH HELB SHIELDING SHELTER PROTECTION SHIELDING STRUCTURAL SUPPORT
SUPPORT	HELB SHIELDING PIPE WHIP RESTRAINT STRUCTURAL SUPPORT
WOOD	SHELTER PROTECTION

2.4.2 Component Supports

Description

Component Supports are structural support members used to transfer loads from systems and components to building structures. They are located in buildings housing safety related equipment, and at plant locations where in scope equipment can be found. Since their components, materials, and environments are similar, Component Supports are evaluated as a plant-wide commodity, and not linked to a specific building.

Support members may include steel wide-flange and I beams, channels, angles, tees, plates, bars, shims, clip angles, banding, build-up sections, rods, cables, bolts, nuts, washers, welds, spring hangers, guides, stops, slide plates, isolation elements, concrete anchors, grout and concrete local to the anchors, and grout pads beneath equipment.

Support members for the following mechanical equipment are in scope and include,

- Piping and valves,
- HVAC ducts and dampers,
- Air handler units,
- Pumps,

- Tanks,
- Heat exchangers,
- Chillers,
- Fans,
- Instrument tubing,
- Tube Track,
- Filter/strainers,
- Pressure vessels,
- Diesel generators and
- Miscellaneous equipment.

Support members for the following electrical and I & C equipment are in scope and include,

- Motors,
- Panels,
- Junction boxes,
- Motor control centers,
- Cabinets,
- Switchgears,
- Buses,
- Bus ducts,
- Batteries,
- Cable trays,
- Conduits,
- Wire-ways, and
- Light fixtures.

Specific electrical and I &C equipment, also in scope, is evaluated under Component Supports and includes,

- Panels,
- Junction boxes,
- Motor control centers,
- Cabinets,
- Bus duct enclosures,
- Cable trays,
- Conduits,

- Wire-ways, and
- Light fixtures.

Component Supports also include insulation. Insulation is credited in evaluations for room heat up, thermally induced pressurization and waterhammer, thermal pressure locking/binding, high energy line break, internal flooding, D1/D2 operability, containment hot piping penetrations, emergency diesel exhaust heat transfer to equipment and rooms, among others.

Not included under Component Supports are masonry wall external support steel, HELB barriers to include pipe whip restraints and jet impingement shields, and miscellaneous structures and their integral attachments (i.e. components whose failure could adversely affect the intended function of safety related components). Miscellaneous structures include:

- Platforms,
- Catwalks,
- Access stairs,
- Ladders,
- Handrails,
- Splash hoods, and
- Racks.

The evaluations for these components can be found in the building where they reside.

System Function Listing

A comprehensive listing of functions associated with the Component Supports, or specific components contained in the group, is provided in the summary below.

Code HGR-01 Component Supports provide structural support to safety related components.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: Component Supports are designed to provide structural support to safety related components relied upon to remain functional during and following design-basis events to ensure satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

Code HGR-AT	Cri 1	Cri 2	Cri 3				
Component Supports provide support to SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.62, Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: Component Supports provide support to equipment required to function in support of the ATWS event and are therefore within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code HGR-EQ	Cri 1	Cri 2	Cri 3				
Component Supports provide support to SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.49, Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: Component Supports provide support to equipment required to function in support of the EQ event and are therefore within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code HGR-FP	Cri 1	Cri 2	Cri 3				
Component Supports provide support to SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: Component Supports provide support to equipment required to function in support of the FP event and are therefore within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code HGR-NSAS	Cri 1	Cri 2	Cri 3				
Component Supports provide support to non-safety related SSCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: Component Supports provide support to non-safety related components whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1), and are therefore within the scope of License Renewal per 10 CFR 54.4(a)(2).

Code HGR-SB	Cri 1	Cri 2	Cri 3				
Component Supports provide support to SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.			FP	EQ	PTS	AT	SB
							X

Comment: Component Supports provide support to equipment required to function in support of the SBO event and are therefore within the scope of License Renewal per 10 CFR 54.4(a)(3).

USAR Reference

Additional Component Supports details are provided in Section 12.2 of the USAR.

License Renewal Drawings

None

Components/Commodities Subject to an AMR

The components for the Component Supports that require an AMR are addressed in Table 2.4.2-1 along with each component's intended function(s).

Table 2.4.2-1 Component Supports

Components	Intended Function
CABINETS, PANELS, RACKS, EQUIPMENT ENCLOSURES, JUNCTION BOXES, BREAKER HOUSINGS, TRANSFORMER HOUSINGS, LIGHTING FIXTURES, AND MISCELLANEOUS EQUIPMENT/INSTRUMENTATION ENCLOSURES	SHELTER PROTECTION STRUCTURAL SUPPORT
CABLE TRAY, CONDUIT, WIREWAY, AND TUBE TRAY	SHELTER PROTECTION STRUCTURAL SUPPORT
HVAC FAN/LOUVER/DAMPER HOUSINGS AND MISCELLANEOUS MECHANICAL EQUIPMENT ENCLOSURES	SHELTER PROTECTION STRUCTURAL SUPPORT
INSULATION AT PENETRATIONS FOR HOT PIPING AT THE OLD SERVICE BUILDING (D1/D2 DIESEL EXHAUST PIPES), AND D5/D6 DIESEL GENERATOR BUILDING (DIESEL EXHAUST PIPES)	THERMAL INSULATION
INSULATION AT PENETRATIONS FOR HOT PIPING AT THE REACTOR CONTAINMENT VESSELS AND SHIELD BUILDINGS	THERMAL INSULATION

Table 2.4.2-1 Component Supports

Components	Intended Function
INSULATION JACKET AT PENETRATIONS FOR HOT PIPING AT THE OLD SERVICE BUILDING (D1/D2 DIESEL EXHAUST PIPES), AND D5/D6 DIESEL GENERATOR BUILDING (DIESEL EXHAUST PIPES)	THERMAL INSULATION
INSULATION JACKET AT PENETRATIONS FOR HOT PIPING AT THE REACTOR CONTAINMENT VESSELS AND SHIELD BUILDINGS	THERMAL INSULATION
INSULATION JACKET ON HIGH ENERGY PIPING IN AREAS SUBJECT TO HELB	THERMAL INSULATION
INSULATION JACKET ON STRUCTURES AND COMPONENTS WITHIN THE REACTOR CONTAINMENT VESSELS	THERMAL INSULATION
INSULATION JACKET ON THE AF TURBINE PUMP CASING, PUMP STEAM SUPPLY, AND PUMP STEAM EXHAUST	THERMAL INSULATION
INSULATION JACKET ON THE RHR TO SI PUMPS WITHIN THE SI ROOM AND ON THE SI PUMP SUCTION LINES WITHIN THE SI ROOM	THERMAL INSULATION
INSULATION ON D1/D2 SENSING LINE ENCLOSURE BOX, D1/D2 DIESEL EXHAUST PIPES, D5/D6 DIESEL EXHAUST PIPES, AND D1/D2 GOVERNOR CABLE	THERMAL INSULATION
INSULATION ON HIGH ENERGY PIPING IN AREAS SUBJECT TO HELB	THERMAL INSULATION
INSULATION ON RH LINES WITHIN THE RH PIT AND ON THE LINES BETWEEN THE CONTAINMENT SPRAY PUMP ROOMS AND RHR PITS	THERMAL INSULATION
INSULATION ON STRUCTURES AND COMPONENTS WITHIN THE REACTOR CONTAINMENT VESSELS	THERMAL INSULATION

Table 2.4.2-1 Component Supports

Components	Intended Function
INSULATION ON THE AF TURBINE PUMP CASING, PUMP STEAM SUPPLY, AND PUMP STEAM EXHAUST	THERMAL INSULATION
INSULATION ON THE RELAY ROOM NORTH WALL OF THE AUXILIARY BUILDING	THERMAL INSULATION
INSULATION ON THE RHR SUCTION LINES BETWEEN MV-32164 TO MV-32165 [MV-32192 TO MV-32193] AND MV-32230 TO MV-32231 [MV-32232 TO MV-32233] IN CONTAINMENT	THERMAL INSULATION
INSULATION ON THE RHR TO SI PUMPS WITHIN THE SI ROOM AND ON THE SI PUMP SUCTION LINES WITHIN THE SI ROOM	THERMAL INSULATION
INSULATION ON THE RHR TO SI VALVES MV-32206 AND MV-32207 [MV-32208 AND MV-32209]	THERMAL INSULATION
INSULATION ON THE RHR TO SI VALVES MV-32206 AND MV-32207 [MV-32208 AND MV-32209], AND INSULATION ON RH LINES WITHIN THE RH PIT AND ON THE LINES BETWEEN THE CONTAINMENT SPRAY PUMP ROOMS AND RHR PITS	THERMAL INSULATION
INSULATION ON THE UNIT 1 SEAL WATER RETURN LINE BETWEEN MV-32199 AND THE CONTAINMENT SHELL	THERMAL INSULATION
METAL ENCLOSED BUS (ENCLOSED ASSEMBLIES)	SHELTER PROTECTION STRUCTURAL SUPPORT
SUPPORT	STRUCTURAL SUPPORT

2.4.3 Cranes, Heavy Loads, Fuel Handling

Description

The License Renewal boundary definition for the Cranes, Heavy Loads, and Fuel Handling System includes all load carrying components associated with heavy load handling systems and light load refueling handling systems which satisfy one or both of the following criteria.

- Provide structural support to safety related components relied upon to remain functional during and following design-basis events to ensure satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1)
- Provide structural support to non-safety related components whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1) and are therefore within the scope of License Renewal per 10 CFR 54.4(a)(2).

Overhead Heavy Load Handling Systems and Light Load (related to refueling) Handling Systems include:

- Containment polar cranes load carrying components including bridge and trolley girders, rails, welded and bolted connections, and other miscellaneous load carrying components
- Turbine building cranes load carrying components including bridge and trolley girders, rails, welded and bolted connections, and other miscellaneous load carrying components
- Auxiliary building crane load carrying components including bridge and trolley girders, rails, welded and bolted connections, and other miscellaneous load carrying components
- Spent fuel pool bridge crane load carrying components including bridge girders, rails, hoist structural frames, welded and bolted connections, lifting tools, and other miscellaneous load carrying components
- Crane above safeguard traveling screens load carrying components including trolley beam and associated welded and bolted connections
- Special lifting devices including the reactor vessel head lifting rig/ spreader/ connecting legs assembly, reactor vessel internals lifting rig, turbine building load spreader assembly, TN-40 cask lift beam and lid lifting rig, temporary rack lifting rig, personnel basket lifting device, reactor vessel stud load handling baskets, RCP lifting device, and CC Heat Exchanger endbell load handling trolleys and endbell carts

- The manipulator cranes load carrying components including bridge and trolley girders and rails, I-beam for auxiliary hoist above manipulator crane platform, welded and bolted connections, and other miscellaneous steel and stainless steel load carrying members
- Fuel transfer system conveyor car load carrying components include the car support frame, conveyor car tracks and associated welded and bolted connections
- Fuel transfer tipping devices load carrying components including upender frames and associated welded and bolted connections

System Function Listing

A comprehensive listing of functions associated with the Cranes, Heavy Loads, Fuel Handling, or specific components contained in the system, is provided in the summary below.

Code CRN-01	Cri 1	Cri 2	Cri 3				
The Cranes, Heavy Loads, and Fuel Handling System provides structural support to safety related components.			FP	EQ	PTS	AT	SB
	X						

Comment: The Cranes, Heavy Loads, and Fuel Handling System provides structural support to safety related components relied upon to remain functional during and following design-basis events to ensure satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

Code CRN-02	Cri 1	Cri 2	Cri 3				
The Cranes, Heavy Loads, and Fuel Handling System contains non-safety related SSCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The Cranes, Heavy Loads, and Fuel Handling System provides structural support to non-safety related components whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1) and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(2).

USAR Reference

Additional Cranes, Heavy Loads, Fuel Handling details are provided in Section 10.2, Section 12.2, Table 12.2-1, Table 12.2-40, and Figure 10.2-1 of the USAR.

License Renewal Drawings

None

Components/Commodities Subject to an AMR

The components for the Cranes, Heavy Loads, Fuel Handling that require an AMR are addressed in Table 2.4.3-1 along with each component's intended function(s).

Table 2.4.3-1 Cranes, Heavy Loads, Fuel Handling

Components	Intended Function
CRANES - RAILS	STRUCTURAL SUPPORT
CRANES - STRUCTURAL GIRDERS	STRUCTURAL SUPPORT

2.4.4 D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building

Description

D5/D6 Diesel Generator Building and Underground Storage Vault

The D5/D6 Diesel Generator Building (DGB) is a safety related reinforced concrete structure. It is located along the west wall of the Auxiliary Building, and is approximately 68 feet by 124 feet with roof elevation at 766'-0". The building is supported on a 4'-0" thick step-down mat foundation at elevations 695'-0" and 687'-0" with an underlying 4" mud slab founded on engineered fill. The mat foundation is independent from the adjacent Auxiliary-Turbine-Shield Building complex. Between the D5/D6 Diesel Generator Building and adjacent Auxiliary and Turbine Buildings, compressible material is used to achieve the specified spacing. Exterior flood panels protect equipment from water intrusion from a design flood.

Housed within the D5/D6 Diesel Generator Building are the following major safety related SSCs.

- D5 and D6 diesel generator sets,
- Diesel Generators and Support System,
- Cooling Water System,
- Fuel Oil System,
- Diesel Generator and Screenhouse Ventilation System, and
- Electrical and Instrumentation and Controls Commodity Group.

Four safety related fuel oil storage tanks are located in the Underground Storage Vault along the west wall of the D5/D6 Diesel Generator Building. The fuel oil tanks are used to supply fuel to the D5 and D6 diesel generators. The safety related reinforced concrete vault is a rectangular structure approximately 34 feet by 100 feet and is founded on engineered fill. The foundation mat at elevation 674’-0" is 2’-0" thick (minimum), and exterior reinforced concrete walls are 1’-8" thick. The roof slab is at grade and is approximately 1’-6" thick (minimum). A portion of the west wall of the D5/D6 Diesel Generator Building is common to the east wall of the Fuel Oil Storage Vault. W24 x 84 steel beams, spaced at 5’-0", are used to support the vault roof slab and other design loads. A 1’-0" thick internal partition wall divides the vault into two compartments. The walls provide fire and flood protection between each diesel generator set’s fuel supply equipment. The vault provides the required 3-hour rated fire protection barrier, as do vault penetrations at the D5/D6 interface. Additionally the vault is designed to withstand the effects of tornado generated missiles, site flood, buoyancy forces, seismic loads, and vehicular traffic on its roof. Leak proof hatches on the vault’s roof provide access for tank internal and external inspections, and allow for removal of tank internal baffles and other appurtenances. Each vault compartment is designed to contain tank leakage and any accumulated water seepage.

No safety related masonry walls are located within the D5/D6 Diesel Generator Building or Underground Fuel Oil Storage Vault.

<u>Fuel Oil Transfer House</u>

The Fuel Oil Transfer House, also known as the filter house, is a small structure located northeast of the Turbine Building. It measures approximately 10’-8" x 12’-0". The structure is supported on reinforced concrete footings poured at elevation 689’-9" and reinforced concrete walls up to elevation 694’-0". A 12" thick reinforced concrete floor slab rests on top of the concrete walls. Masonry block walls makeup the exterior walls above the floor slab and extend up to the roof at elevation 708’-2". Components in scope of License Renewal are located below the concrete floor slab. Access to the building is provided at ground level elevation 695’-0’’ through a metal door, and access to in scope components below the floor slab is provided by a hatchway located in the concrete floor. The top of the 12" floor slab provides the upper boundary between safety related and non-safety related construction.

<u>Old Service Building</u>

The Old Service Building is a multi-level reinforced concrete and steel framed structure. Its foundation has structural continuity with the Auxiliary-Turbine-Shield Building complex and houses the safety related D1/D2 emergency diesel generators and other non-safety related SSCs. It is bordered on the west by the Auxiliary Building and Unit 1 Shield Building and on the north by the Turbine Building. The building foundation incorporates perimeter footings and a 3’-0" thick reinforced concrete mat placed on a 4" mud slab and waterproofing membrane. The top of the foundation is at elevation 693'-0" and an additional two feet of unreinforced concrete is used for the placement of embedded items.

The safety related D1/D2 emergency diesel generators are located in separate reinforced concrete rooms within the Old Service Building at ground floor elevation 695'-0". The concrete floors at 715'-0" and 735'-0" and the supporting structural steel beams and columns are safety related since the scavenging air intake filters, the D1/D2 diesel generator room ventilation duct, dampers, and a section of the D1 diesel exhaust line are located above elevation 715'-0" and below elevation 735'-0" floor slab. Exterior flood door protects equipment from water intrusion from a design flood. Compressible expansion joint material covered with an aluminum cap is used between the Old Service Building and Shield Building walls to achieve the specified spacing and to provide protection. Safety related masonry walls are located on el. 715’-0" of this building.

New Service Building

The New Service Building is a three story steel framed structure located adjacent to the east walls of the Old Service Building and Turbine Building. Its reinforced concrete foundation is built on grade and is designed to accommodate various existing buried components including the circulating water concrete pipes. The D1/D2 fuel oil tank supply and return lines from the Fuel Oil Transfer House run through the concrete support bridges under the New Service Building ground floor.

The building dimensions are approximately 82’-0” x 73’-7” and the high point of the roof steel is at elevation 755’-0”. The exterior walls are insulated metal panels and the interior walls are a system of metal studs and fire rated gypsum board and non-safety related masonry walls. Flooring is either reinforced concrete or composite reinforced concrete and metal decking. Aluminum capped compressible expansion joint material is used between adjacent buildings to achieve the specified spacing and provide protection.

Housed within the structure are the 480v buses, batteries, and associated cable trays and conduits which are components relied on to perform a function in compliance with the SBO regulated event, as are the non-safeguards uninterruptible power supply and event monitoring inverters which are relied on to perform a function in compliance with the anticipated transients without scram (ATWS) regulated event. No safety related components are housed within the New Service Building. Only components required to perform a function that demonstrates compliance with the Commission’s regulations are in scope of License Renewal. In addition, the supporting components for regulated event equipment (e.g. support members down to the floor anchorage and the concrete local to the floor attachment) are in scope of License Renewal.

Due to the close proximity of the New Service Building to the safety related Old Service Building, main load carrying structural steel components and supporting foundation are in scope of License Renewal to ensure against failure that could impact the intended function of the adjacent safety related structure.

System Function Listing

A comprehensive listing of functions associated with the D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building, or specific components contained in the structure, is provided in the summary below.

Code DGB-01	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The D5/D6 Diesel Generator Building and Underground Fuel Oil Storage Vault provide structural support to safety related components.	X						

Comment: The D5/D6 Diesel Generator Building and Underground Fuel Oil Storage Vault are designed to provide structural support to safety related components relied upon to remain functional during and following design-basis events to ensure satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

Code DGB-02	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The D5/D6 Diesel Generator Building and Underground Fuel Oil Storage Vault provide flood protection from internal and external flooding events.	X						

Comment: The D5/D6 Diesel Generator Building and Underground Fuel Oil Storage Vault are designed to protect safety related components from the effects of internal and external flooding events. For external flooding protection, the D5/D6 Diesel Generator Building and the Underground Fuel Oil Storage Vault base slabs and the exterior walls are designed to resist the full hydrostatic head of the probable maximum flood. Buildings are protected with a weatherproof membrane and construction joints are keyed and provided with water stops. Openings through the exterior walls are closed prior to flooding with bulkheads stored on site.

Code DGB-03	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The D5/D6 Diesel Generator Building and Underground Fuel Oil Storage Vault provide a missile barrier for internally and/or externally generated missiles.	X						

Comment: The D5/D6 Diesel Generator Building walls and roofs and the Underground Fuel Oil Storage Vault roof provide protection to safety related components from the effects of tornado generated missiles and diesel generator missiles.

Code DGB-04	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The D5/D6 Diesel Generator Building and Underground Fuel Oil Storage Vault provide shelter and protection to safety related components.	X						

Comment: The D5/D6 Diesel Generator Building and Underground Fuel Oil Storage Vault provide shelter and protection for safety related components from the adverse effects of postulated low temperatures, adverse atmosphere, and environmental conditions.

Code DGB-AT	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The D5/D6 Diesel Generator Building contains SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.62, Anticipated Transients Without Scram.						X	

Comment: The D5/D6 Diesel Generator Building houses, supports, and protects equipment relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.62, Anticipated Transient Without Scram regulation, and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code DGB-FP	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The D5/D6 Diesel Generator Building contains SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			X				

Comment: The D5/D6 Diesel Generator Building houses, supports, and protects equipment required to function in support of the FP event and therefore within the scope of License Renewal per 10 CFR 54.4(a)(3).

The D5/D6 Diesel Generator Building and Underground Fuel Oil Storage Vault concrete walls and floors provide physical boundaries that make up fire areas designed to protect Appendix R safe shutdown equipment from a fire.

Code DGB-NSAS The D5/D6 Diesel Generator Building and the Underground Fuel Oil Storage Vault contain non-safety related SSCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The D5/D6 Diesel Generator Building and the Underground Fuel Oil Storage Vault are designed to provide structural support to non-safety related components whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1), and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(2).

Code DGB-SB The D5/D6 Diesel Generator Building and Underground Fuel Oil Storage Vault contain SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: The D5/D6 Diesel Generator Building and the Underground Fuel Oil Storage Vault house, support, and protect equipment required to function in support of SBO coping and mitigation, and therefore are within the scope of License Renewal per 10 CFR 54.4(a)(3).

D5/D6 diesel generators and fuel oil tanks provide emergency power to equipment essential to core heat removal, primary system integrity, secondary side heat removal, and process monitoring.

Code FOH-01 The Fuel Oil Transfer House provides structural support to safety related components.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The Fuel Oil Transfer House is designed to provide structural support to safety related components relied upon to remain functional during and following design-basis events to ensure satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

Code FOH-02 The Fuel Oil Transfer House provides a missile barrier for externally generated missiles.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The Fuel Oil Transfer House area where safety related components are housed provides for their protection from the effects of tornado generated missiles.

Code FOH-03 The Fuel Oil Transfer House provides shelter and protection to safety related components.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The Fuel Oil Transfer House provides shelter and protection for safety related components from the adverse effects of postulated low temperatures, adverse atmosphere, and environmental conditions.

Code FOH-NSAS The Fuel Oil Transfer House contains non-safety related SSCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The Fuel Oil Transfer House is designed to provide structural support to non-safety related components whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1), and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(2).

Code OSB-01 The Old Service Building provides structural support to safety related components.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: Reinforced concrete rooms in the Old Service Building enclosing the diesel generators and the diesel exhaust line are designed to provide structural support to the diesels and associated safety related components relied upon to remain functional during and following design-basis events to ensure satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

Code OSB-02 The Old Service Building provides flood protection from internal and external flooding events.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The Old Service Building rooms enclosing the diesel generators and the building's external flood walls are designed to protect the diesels and associated safety related components from the effects of flooding. Construction joints are keyed and provided with water stops, and a waterproofing membrane is incorporated in the foundation design.

Code OSB-03 The Old Service Building provides a missile barrier for internally and/or externally generated missiles.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The Old Service Building rooms enclosing the diesel generators provide protection to safety related components from the effects of tornado generated missiles and internally generated diesel generator missiles. The wall separating the two diesel generators includes an access door. Since the door is parallel with the rotation of the diesel generator, it is not credible that an internal missile generated by the failure of one diesel generator will breach this opening.

Code OSB-04	Cri 1	Cri 2	Cri 3				
The Old Service Building provides shelter and protection to safety related components.			FP	EQ	PTS	AT	SB
	X						

Comment: The Old Service Building rooms enclosing the diesel generators and the compartments enclosing the diesel exhaust line provide shelter and protection to safety related components from the adverse effects of postulated low temperatures, adverse atmosphere, and environmental conditions.

Code OSB-FP	Cri 1	Cri 2	Cri 3				
The Old Service Building contains SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: The Old Service Building rooms enclosing the diesel generators and the compartments enclosing the diesel exhaust line house, support, and protect equipment required to function in support of the fire protection event and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code OSB-NSAS	Cri 1	Cri 2	Cri 3				
The Old Service Building contains non-safety related SSCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The Old Service Building rooms enclosing the diesel generators and the compartments enclosing the diesel exhaust line provide structural support to non-safety related components whose failure could damage safety related components and prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1), and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(2).

Code OSB-SB	Cri 1	Cri 2	Cri 3				
The Old Service Building contains SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.			FP	EQ	PTS	AT	SB
							X

Comment: The Old Service Building rooms enclosing the diesel generators and the compartments enclosing the diesel exhaust line house, support, and/or protect equipment required to function in support of SBO coping and mitigation and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code NSB-SB	Cri 1	Cri 2	Cri 3				
The New Service Building contains SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.			FP	EQ	PTS	AT	SB
							X

Comment: The New Service Building provides structural support to SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for SBO and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code NSB-AT	Cri 1	Cri 2	Cri 3				
The New Service Building contains SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.62, Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: The New Service Building provides structural support to SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for ATWS, and therefore is within scope of License Renewal per 10 CFR 54.4(a)(3).

Code NSB-NSAS	Cri 1	Cri 2	Cri 3				
The New Service Building maintains its structural integrity against postulated failure that could adversely affect the adjacent safety related Auxiliary Building’s ability to perform its intended functions.			FP	EQ	PTS	AT	SB
		X					

Comment: The New Service Building is an unclassified structure. It does not house safety related SSCs. To ensure that it will maintain its structural integrity during and following design-basis events and not adversely affect the adjacent safety related Auxiliary Building’s ability to satisfactorily accomplish its intended functions identified in 10 CFR 54.4(a)(1), main load carrying members and building foundation will be included within the scope of License Renewal per 10 CFR 54.4(a)(2).

USAR Reference

Additional D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building details are provided in Section 7.11 and Section 12.2 of the USAR.

License Renewal Drawings

The License Renewal drawings for the D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building are listed below:

Common	Unit 1	Unit 2
LR-193817	None	None

Components/Commodities Subject to an AMR

The components for the D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building that require an AMR are addressed in Table 2.4.4-1 along with each component's intended function(s).

Table 2.4.4-1 D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building

Components	Intended Function
ALUMINUM	EXPANSION/SEPARATION
CONCRETE	DIRECT FLOW FIRE BARRIER FLOOD BARRIER MISSILE BARRIER SHELTER PROTECTION STRUCTURAL SUPPORT
ELASTOMERS	EXPANSION/SEPARATION FLOOD BARRIER SHELTER PROTECTION
MASONRY WALLS	FIRE BARRIER STRUCTURAL SUPPORT
ROOFING	SHELTER PROTECTION

Table 2.4.4-1 D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building

Components	Intended Function
STEEL COMPONENTS	DIRECT FLOW FLOOD BARRIER STRUCTURAL SUPPORT
SUPPORT	STRUCTURAL SUPPORT

2.4.5 Fire Protection Barriers

Description

Fire Protection Barriers provide fire protection to plant SSCs important to nuclear safety so that safe shutdown can be achieved and maintained. Additionally Fire Protection Barriers are relied on to minimize the effects of a fire and to prevent the release of radiation to the environment.

PINGP is divided into separate fire areas by concrete walls, floors, and ceilings, referred to as principal fire barriers. Opening or penetrations in principal fire barriers that allow passage of personnel, material or SSCs are tightly sealed with fireproofing materials or fire rated doors to ensure the fire will not spread from one area to another. These Fire Protection Barriers maintain the fire-resistive integrity of the principal barrier.

Fire Protection Barriers are also used to protect SSCs important to nuclear safety within a fire area. SSCs are encapsulated and or separated with fireproofing materials designed to a specific fire rating. In some cases SSCs for redundant divisions or trains important to safety are located within the same fire area, and must be separated so that both are not subject to fire damage. Fireproofing materials provide the necessary separation in addition to other separation requirements addressed in NRC Branch Technical Position 9.5-1 or 10 CFR Part 50, Appendix R.

Fire Protection Barriers at PINGP are evaluated as a commodity group and include the following components/materials.

- Fire barrier penetration seals (elastomers, cementitious fireproofing, and concrete)
- Fire barrier gaskets below fuel oil containment angles (elastomers)
- Fire rated doors (steel)

- Concrete
- Masonry walls
- Stainless steel components
- Steel components
- Non-metallic fireproofing including fire wraps and partitions

Steel structures (the containment pressure vessels) and structural concrete walls, ceilings, and floors and masonry walls that perform a fire barrier function are evaluated in the building where they reside (e.g. masonry walls and structural concrete in the Turbine Building that perform a fire barrier function are found in the Turbine Building section).

Hydrant houses (sheet steel enclosures on concrete slabs), which are not fire barriers, are also included in this section.

System Function Listing

A comprehensive listing of functions associated with the Fire Protection Barriers, or specific components contained in the group, is provided in the summary below.

Code FPB-FP	Cri 1	Cri 2	Cri 3				
Fire Protection Barriers support SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: Fire Protection Barrier components provide fireproofing used to close gaps between adjacent fire areas to prevent the fire from spreading and therefore maintaining the capability to safely shutdown the plant if fires occur. Fire Protection Barriers provide the rated fireproofing used to protect SSCs within a fire area to reduce fire damage and prevent the release of a significant amount of radioactive materials. Additionally Fire Protection Barriers are used to separate redundant divisions or trains of safety related systems from each other so that both are not subject to damage from a single fire.

USAR Reference

Additional Fire Protection Barriers details are provided in Section 10.3 of the USAR.

License Renewal Drawings

None

Components/Commodities Subject to an AMR

The components for the Fire Protection Barriers that require an AMR are addressed in Table 2.4.5-1 along with each component's intended function(s).

Table 2.4.5-1 Fire Protection Barriers

Components	Intended Function
CONCRETE	STRUCTURAL SUPPORT
FIRE BARRIER GASKETS	FIRE BARRIER
FIRE BARRIER PENETRATION SEALS	FIRE BARRIER FLOOD BARRIER
FIRE RATED DOORS	FIRE BARRIER FLOOD BARRIER GASEOUS RELEASE PATH HELB SHIELDING SHELTER PROTECTION
FIREPROOFING	FIRE BARRIER
STAINLESS STEEL COMPONENTS	FIRE BARRIER STRUCTURAL SUPPORT
STEEL COMPONENTS	FIRE BARRIER SHELTER PROTECTION STRUCTURAL SUPPORT

2.4.6 Radwaste Building, Old Administration Building, and Administration Building Addition

Description

Radwaste Building

The Radwaste Building is a concrete and steel framed structure approximately 103'-0" (E-W) by 33'-8" (N-S). It is supported by a 3'-0" thick mat foundation and perimeter footings placed on a 4" mud mat and waterproofing membrane with the top foundation elevation at 695'-0". Structural steel framing, supported from walls at elevations 708'-0" and 715'-0", extend up to the roof at elevations at 732'-3" and 739'-0". Insulated metal siding forms the building's exterior shell. To its north is the Auxiliary Building, and to its south are the Resin Disposal Building and maintenance storage shed. A seismic joint separates the Radwaste Building from the Auxiliary Building.

The Radwaste Building houses radioactive waste handling, treatment, storage, and disposal facilities for both Units. Ground floor slab is divided into individual compartments constructed from reinforced concrete and fully grouted block. The compartments provide for storage and shielding of the miscellaneous drains collection tank, aerated drains treatment (ADT) evaporator, and waste concentrates tank. Additional equipment at elevation 715'-0" includes the ADT collection tanks, ADT monitor tanks, and ADT condensate receiver tanks among others. The Radwaste Building components such as sumps, dikes, curbs, walls, or vaults are specifically constructed to retain any spilled liquid. Spills may also drain directly to the Radwaste Building sump. Radwaste Building components are designed to ensure that they are capable of containing the liquid wastes during seismic events.

The Radwaste Building is classified as a safety related structure however it does not perform any intended function for License Renewal. It does not house any safety related or event-related components. Since it is adjacent to the safety related Auxiliary Building, it is in scope of License Renewal for criterion 10CFR54.4(a)(2), non-safety affecting safety.

<u>Old Administration and Administration Building Addition</u>

The Old Administration Building is part of the original construction having structural continuity with the foundations of the Turbine Building, Auxiliary Building and Shield Buildings. It is a rectangular shaped structure approximately 75’-0" in the east-west direction and 55’-0" in the north-south direction, and is located adjacent to the north wall of the Turbine Building. Located immediately below the center portion of the Old Administration Building is the Turbine Building safety related reinforced concrete aisle. The safety related aisle foundation slab is built on grade at elevation 695’-0 with ceiling slab at elevation 715’-0". The Old Administration Building above the aisle extends from elevation 715’-0" to the roof at elevation 750’-0" with an intermediate floor at elevation 735’-0". The building’s frame is structural steel, the roof is built-up roofing materials, and the exterior walls are covered with insulated metal siding.

In order to meet space requirements for offices, storage areas, lockers, etc, a building addition was constructed. The Administration Building Addition is a five story structure build on reinforced concrete footings and pier foundations with slab on grade at elevation 695’-0". The addition is a “U” shaped structure that wraps around the north, east, and west sides of the Old Administration Building. The outside dimensions are approximately

106’-0" by 43’-0". The Administration Building Addition is a steel framed structure covered in insulated metal siding with a built-up roof at elevation at 750’-0".

The Old Administration Building and the Administration Building Addition do not house any safety related or event-related components and are non-safety related buildings. However since they are located above/adjacent to the Turbine Building safety related reinforced concrete aisle and the 30 inch cooling water supply and return lines, both the Old Administration Building and the Administration Building Addition are in scope of License Renewal for criterion 10 CFR 54.4(a)(2), non-safety affecting safety.

System Function Listing

A comprehensive listing of functions associated with the Radwaste Building, Old Administration Building, and Administration Building Addition, or specific components contained in the structures, is provided in the summary below.

Code RWB-01	Cri 1	Cri 2	Cri 3				
The Radwaste Building provides structural support to non-safety related components.			FP	EQ	PTS	AT	SB

Comment: The Radwaste Building provides structural support to non-safety related components. It does not house safety related SSCs and does not contain SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with any regulated event. The structural integrity of non-safety related SSCs is of no concern for License Renewal. This function does not meet any of the scoping criteria of 10 CFR 54.4 for License Renewal.

Code RWB-02	Cri 1	Cri 2	Cri 3				
The Radwaste Building provides radiation shielding for plant personnel and equipment during normal operation.			FP	EQ	PTS	AT	SB

Comment: There are no SSCs in the Radwaste Building relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with any regulated event. Also there are no safety related SSCs housed in the Radwaste Building and therefore this function does not meet any of the scoping criteria of 10 CFR 54.4 for License Renewal.

Code RWB-03	Cri 1	Cri 2	Cri 3				
The Radwaste Building provides a means to contain or direct the flow of liquids.			FP	EQ	PTS	AT	SB

Comment: There are no SSCs in the Radwaste Building relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with any regulated event. Also there are no safety related SSCs housed in the Radwaste Building and therefore this function does not meet any of the scoping criteria of 10 CFR 54.4 for License Renewal.

Code RWB-04	Cri 1	Cri 2	Cri 3				
The Radwaste Building provides shelter and protection for non-safety related components only.			FP	EQ	PTS	AT	SB

Comment: There are no SSCs in the Radwaste Building relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with any regulated event. Also there are no safety related SSCs housed in the RWB and therefore this function does not meet any of the scoping criteria of 10 CFR 54.4 for License Renewal.

Code RWB-NSAS	Cri 1	Cri 2	Cri 3				
The Radwaste Building maintains its structural integrity against postulated failure that could adversely affect the adjacent safety related Auxiliary Building's ability to perform its intended functions.			FP	EQ	PTS	AT	SB
		X					

Comment: The Radwaste Building is a safety-related structure per the USAR Section 12.2. This classification ensures that it will maintain its structural integrity and remain functional during and following design-basis events and not adversely affect the adjacent safety related Auxiliary Building’s ability to satisfactorily accomplish its intended functions identified in 10 CFR 54.4(a)(1). Therefore the Radwaste Building is within the scope of License Renewal per 10 CFR 54.4(a)(2).

Code OAD-01	Cri 1	Cri 2	Cri 3				
The Old Administration Building and Administration Building Addition provide structural support to non-safety related components.			FP	EQ	PTS	AT	SB

Comment: The Old Administration Building and Administration Building Addition provide structural support to non-safety related components. They do not house safety related SSCs and do not contain SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with any regulated event. The structural integrity of non-safety related SSCs is of no concern for License Renewal. This function does not meet any of the scoping criteria of 10 CFR 54.4 for License Renewal.

Code OAD-02	Cri 1	Cri 2	Cri 3				
The Old Administration Building and Administration Building Addition provide shelter and protection for non-safety related components only.			FP	EQ	PTS	AT	SB

Comment: There are no safety related SSCs housed in the Old Administration Building and Administration Building Addition and therefore this function does not meet any of the scoping criteria of 10 CFR 54.4 for License Renewal.

Code OAD-NSAS	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Old Administration Building and Administration Building Addition maintain their structural integrity against postulated failure that could adversely affect the adjacent safety related portion of the Turbine Building in its ability to perform its intended function.		X					

Comment: The Old Administration Building and Administration Building Addition are non-safety related structures designed for seismic loading per USAR Section 12.2. Their design ensures that they will maintain their structural integrity and remain functional during and following a seismic event and not adversely affect the adjacent safety related portion of the Turbine Building in its ability to satisfactorily accomplish its intended functions identified in 10 CFR 54.4(a)(1). Therefore the Old Administration Building and Administration Building Addition are within the scope of License Renewal per 10 CFR 54.4(a)(2).

USAR Reference

Additional Radwaste Building, Old Administration Building, and Administration Building Addition details are provided in Section 9.2 and Section 12.2 of the USAR.

License Renewal Drawings

The License Renewal drawings for the Radwaste Building, Old Administration Building, and Administration Building Addition are listed below:

Common	Unit 1	Unit 2
LR-193817	None	None

Components/Commodities Subject to an AMR

The components for the Radwaste Building, Old Administration Building, and Administration Building Addition that require an AMR are addressed in Table 2.4.6-1 along with each component's intended function(s).

Table 2.4.6-1 Radwaste Building, Old Administration Building, and Administration Building Addition

Components	Intended Function
CONCRETE	FIRE BARRIER STRUCTURAL SUPPORT
ELASTOMERS	EXPANSION/SEPARATION
STEEL COMPONENTS	STRUCTURAL SUPPORT

2.4.7 Reactor Containment Vessels Units 1 and 2

Description

The containment for each Unit was designed by Pioneer Service and Engineering Company and consists of two systems:

- A primary containment consisting of a free-standing, low-leakage steel vessel, including its penetrations, isolation systems, and heat removal systems designed to withstand the internal pressure accompanying a loss-of coolant accident, and
- A secondary medium leakage concrete Shield Building surrounding the primary containment, including special ventilation systems for its annulus and adjacent Auxiliary Building.

The primary containment system, also referred to as the Reactor Containment Vessel, consists of steel cylinder walls, a hemispherical dome, and an ellipsoidal bottom. A five foot wide annular space exists between the Reactor Containment Vessel walls and the Shield Building walls, and a seven foot clearance exists between the top of the vessel and Shield Building roof dome permitting in-service inspection and collection of containment out-leakage. The steel pressure vessel and all penetration assemblies form the primary containment boundary. The Reactor Containment Vessel cylinder wall outside diameter is 105'-3", dome radius is 52'-6", overall height is 206'-7 7/8", vessel wall thickness varies from 3/4" to 1 1/2", and vessel material is ASME SA516 Grade 70 steel. With the exception of the unreinforced concrete placed underneath and near the ellipsoidal knuckle sides of the vessel, there are no structural ties between the Reactor Containment Vessel and the Shield Building above the foundation. The unreinforced concrete supporting its ellipsoidal bottom is tightly bonded to the outside of the vessel and the underlying reinforced concrete mat foundation, and is approximately 2'-10 1/2" thick (minimum). The mat foundation, which is common to the Shield Building, is 4'-0" thick and is placed on a 4" mud mat and weatherproofing membrane resting on controlled recompacted soils. The mat foundation also has structural continuity with the Auxiliary Building and Turbine Building foundations.

The Reactor Containment Vessel internal structure is for the most part conventionally reinforced concrete. The concrete forms floor slabs and compartments that support and protect the reactor pressure vessel (RPV) and components associated with engineered safeguards systems, and it provides the primary biological shield for the RPV. At various levels, concrete slabs are supported by structural steel framing which is supported off the central concrete core and peripheral steel columns. The internal structure is supported by reinforced concrete placed in the bottom and knuckle region of the Reactor Containment

Vessel. Except for the contact at the base, the internal structure is completely isolated from the inside face of the Reactor Containment Vessel.

Reactor Containment Vessel major internal structural components include:

- Reactor/refueling cavity/biological shield wall
- Steam Generator and Pressurizer vaults
- Refueling floor - El. 755’-0”
- Operating floor - El. 733’-9”
- Mezzanine floor - El. 711’-6”
- Basement floor - El. 697’-6”

System Function Listing

A comprehensive listing of functions associated with the Reactor Containment Vessels Units 1 and 2, or specific components contained in the structure, is provided in the summary below.

Code RCV-01	Cri 1	Cri 2	Cri 3				
Reactor Containment Vessels and their internal structures provide structural support to safety related components.			FP	EQ	PTS	AT	SB
	X						

Comment: Reactor Containment Vessels and their internal structures are designed to provide structural support to safety related components relied upon to remain functional during and following design-basis events to ensure satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

Code RCV-02	Cri 1	Cri 2	Cri 3				
Reactor Containment Vessels and their internal structures provide flood protection from internal flooding events.			FP	EQ	PTS	AT	SB
	X						

Comment: Reactor Containment Vessels and their internal structures provide flood protection from internal flooding events.

Code RCV-03 Reactor Containment Vessels and their internal structures provide missile protection for internally generated missiles.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: Reactor Containment Vessels and their internal structures are designed to withstand the effects of internally generated missiles without loss of function. Reinforced concrete walls and steel structures inside each Reactor Containment Vessel provide missile protection. Internally generated missiles include RCCA drive mechanisms, pipe and pipe pieces, pressurizer valves, valve stems and bonnets, nuts and bolts of various sizes, instrument thimbles, and others.

Each Reactor Containment Vessel is completely surrounded by a Shield Building which provides vessel protection from externally generated missiles.

Code RCV-04 Reactor Containment Vessels and their internal structures provide shielding against high energy line breaks.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: Reactor Containment Vessels and their internal structures are designed to withstand the effects of high energy line breaks without loss of function. Reinforced concrete walls and steel structures inside each Reactor Containment Vessel shield safety related equipment from the effects of a HELB.

Code RCV-05 Reactor Containment Vessels and their internal structures provide shielding against radiation.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: Reactor Containment Vessels and their internal structures provide radiation shielding and protection for the public from the consequences of a design basis event and during normal operation. Additional radiation shielding is provided by the Shield Building that surrounds each Reactor Containment Vessel. The Shield Building in combination with its ventilation system enables the plant to comply with 10 CFR 100 and 10 CFR 50.67.

Therefore each Reactor Containment Vessel is within the scope of License Renewal per 10 CFR 54.4(a)(1).

Code RCV-06	Cri 1	Cri 2	Cri 3				
Reactor Containment Vessels provide a pressure boundary to protect the public.			FP	EQ	PTS	AT	SB
	X						

Comment: Reactor Containment Vessels provide a pressure boundary to protect public health and safety in the event of any postulated design basis event. Each Reactor Containment Vessel including its steel shell, air locks, and all other penetrations are designed as structural pressure barriers for a maximum internal pressure of 46 psig coincident with a temperature of 268°F. Each Reactor Containment Vessel is a Class B vessel as defined in the ASME Boiler and Pressure Vessel Code, Section III, Nuclear Vessels N-132.

Code RCV-AT	Cri 1	Cri 2	Cri 3				
Reactor Containment Vessels and their internal structures contain SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.62, Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: Reactor Containment Vessels and their internal structures house, support, and/or protect equipment required to function in support of the ATWS event, and therefore are within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code RCV-FP	Cri 1	Cri 2	Cri 3				
Reactor Containment Vessels and their internal structures contain SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: Reactor Containment Vessels and their internal structures house, support, and/or protect equipment required to function in support of the FP event. Each Reactor Containment Vessel and its internal reinforced concrete components provide a fire barrier boundary to stop the spread of fire to adjacent fire areas, and therefore are within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code RCV-NSAS	Cri 1	Cri 2	Cri 3				
Reactor Containment Vessel internal structures support non-safety related SSCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: Reactor Containment Vessel internal structures provide support to non-safety related components whose failure could damage safety related components and prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1), and therefore are within the scope of License Renewal per 10 CFR 54.4(a)(2).

Code RCV-SB	Cri 1	Cri 2	Cri 3				
Reactor Containment Vessels and their internal structures contain SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.			FP	EQ	PTS	AT	SB
							X

Comment: Reactor Containment Vessels and their internal structures house, support, and/or protect equipment required to function in support of SBO coping and mitigation, and therefore are within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code RCV-PT	Cri 1	Cri 2	Cri 3				
Reactor Containment Vessels and their internal structures contain SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.61, Pressurized Thermal Shock.			FP	EQ	PTS	AT	SB
					X		

Comment: Reactor Containment Vessels and their internal structures house, support, and/or protect equipment required to function in support of PTS event, and therefore are within the scope of License Renewal per 10 CFR 54.4(a)(3).

USAR Reference

Reactor Containment Vessels Units 1 and 2 details are provided in Section 5.1, Section 5.2, Section 12.2, and Section 12.3 of the USAR.

License Renewal Drawings

The License Renewal drawings for the Reactor Containment Vessels Units 1 and 2 are listed below:

Common	Unit 1	Unit 2
LR-193817	None	None

Components/Commodities Subject to an AMR

The components for the Reactor Containment Vessels Units 1 and 2 that require an AMR are addressed in Table 2.4.7-1 along with each component's intended function(s).

Table 2.4.7-1 Reactor Containment Vessels Units 1 and 2

Components	Intended Function
CONCRETE	HELB SHIELDING MISSILE BARRIER SHELTER PROTECTION SHIELDING STRUCTURAL SUPPORT
MASONRY WALLS	SHIELDING
MOISTURE BARRIERS	SHELTER PROTECTION
PENETRATION SLEEVES	FIRE BARRIER STRUCTURAL PRESSURE BARRIER STRUCTURAL SUPPORT
PENETRATION SLEEVES, PENETRATION BELLOWS	FIRE BARRIER STRUCTURAL PRESSURE BARRIER
PERSONNEL AIR LOCK, EQUIPMENT HATCH	FIRE BARRIER STRUCTURAL PRESSURE BARRIER
PERSONNEL AIR LOCK, EQUIPMENT HATCH, LOCKS, HINGES AND CLOSURE MECHANISMS	STRUCTURAL SUPPORT
SEALS, GASKETS	STRUCTURAL PRESSURE BARRIER
STAINLESS STEEL COMPONENTS	FLOOD BARRIER STRUCTURAL SUPPORT
STEEL COMPONENTS	DIRECT FLOW FIRE BARRIER MISSILE BARRIER SHELTER PROTECTION STRUCTURAL PRESSURE BARRIER STRUCTURAL SUPPORT

Table 2.4.7-1 Reactor Containment Vessels Units 1 and 2

Components	Intended Function
SUPPORT	HELB SHIELDING PIPE WHIP RESTRAINT STRUCTURAL SUPPORT

2.4.8 SBO Yard Structures

Description

The SBO Yard Structures System includes SSC that serve a structural function related to supporting certain electrical equipment and conductors required to restore offsite power following a station blackout (SBO) event defined in 10 CFR 50.63. Some of this same equipment is also used to supply offsite power for safe shutdown in response to certain fire scenarios postulated in accordance with 10 CFR 50.48. The electrical equipment included in the offsite power restoration paths is discussed in Section 2.5 and shown on Scoping Boundary Drawing LR-119871. Offsite power is restored to vital busses in Unit 1 following SBO via the 1R or CT-11 transformers, and to vital busses in Unit 2 via the 2RS or CT-12 transformers.

The SBO Yard Structures System consists of the following SSC, which are shown on License Renewal Drawing LR-193817.

- The Substation Control House, a steel framed and metal sided single story building located in the switchyard, houses the electrical controls, metering devices and emergency power sources essential to the operation of switchyard equipment. The building is supported by a concrete slab placed directly on well drained granular soil. Electrical cables between the building and switchyard equipment are underground and enter the building through openings in the slab.
- The Cooling Tower Equipment House, a single story concrete block building located outside the protected area fence about 400 ft. south of the Unit 1 Reactor Building, contains circulating water system electrical equipment as well as equipment used to route electrical power during recovery from a station blackout event. The building has a concrete slab floor placed directly on well drained granular soil; block walls are supported by concrete stem walls bearing on spread footings. Electrical cables between the building and other areas of the plant are underground and enter the

building through openings in the slab. Bus ducts from the adjacent CT-11 and CT-12 transformers enter through penetrations in the block walls.

- Three Transmission Towers support the 161 kV conductors that run from the disconnect in switchyard to the 1R transformer, which is adjacent to the north side of the Turbine Building. The 68 ft. high steel towers are supported on concrete piers that extend down to concrete foundation slabs placed on granular soil about 7.5 ft. below grade.

  The conductors hang on ceramic insulators which are connected to the tower cross arms by steel swivels. The steel elements comprising the swivels are considered structural elements by NUREG-1801 and are in scope for aging management.

- Outdoor Electrical Equipment Support Structures within the scope of the SBO Yard Structures System are those that support power transformers, transformer oil tanks, disconnects, breakers, control / metering devices, bus duct and rigid insulators. Power transformers are supported by concrete slabs. The transformers which can be a part of the SBO recovery path include the No. 1 Cooling Tower Area transformer which is inside the Substation fence, the 1R, 2RX and 2RY transformers located along the north side of the Turbine Building and, the CT-11 and CT-12 transformers which are adjacent to the Cooling Tower Equipment House.

  Other items of electrical equipment are supported by light steel and / or aluminum structures that rest on concrete foundations or on the transformer slabs. Most of these structures are located in the Substation. The others are adjacent to the 1R, 2RX, 2RY, CT-11 and CT-12 transformers.

- The single Manhole Structure within the scope of the SBO Yard Structures System is located about 100 ft. west of the Security Building and provides access to splices in the 13.8 kV cables that run from the switchyard to the Cooling Tower Equipment Control House. The structure, which has no bottom slab, is a prefabricated concrete box founded on granular soil about 8.5 ft. below plant grade.

Bus duct (both metal duct assemblies and elastomer joint seals) and enclosures / housings for electrical equipment within the SBO circuit boundaries described above are included with Component Supports.

System Function Listing

A comprehensive listing of functions associated with the SBO Yard Structures, or specific components contained in the structures, is provided in the summary below.

Code SBO-FP	Cri 1	Cri 2	Cri 3				
The SBO Yard Structures System is relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: The SBO Yard Structures System supports equipment required to function in support of the Fire Protection event. The SBO Yard Structures System does not provide a fire barrier function.

Code SBO-SB	Cri 1	Cri 2	Cri 3				
The SBO Yard Structures System is relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.			FP	EQ	PTS	AT	SB
							X

Comment: The SBO Yard Structures System supports equipment required to function in support of SBO coping and mitigation and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(3).

USAR Reference

Additional SBO Yard Structures details are provided in Section 8 of the USAR.

License Renewal Drawings

The License Renewal drawings for the SBO Yard Structures are listed below:

<u>Common</u>	<u>Unit 1</u>	<u>Unit 2</u>
LR-193817	None	None

Components/Commodities Subject to an AMR

The components for the SBO Yard Structures that require an AMR are addressed in Table 2.4.8-1 along with each component's intended function(s).

Table 2.4.8-1 SBO Yard Structures

Components	Intended Function
CONCRETE	STRUCTURAL SUPPORT
HIGH VOLTAGE INSULATOR STEEL SWIVELS	STRUCTURAL SUPPORT

Table 2.4.8-1 SBO Yard Structures

Components	Intended Function
MASONRY WALLS	STRUCTURAL SUPPORT
STEEL COMPONENTS	STRUCTURAL SUPPORT
SUPPORT	STRUCTURAL SUPPORT

2.4.9 Shield Buildings Units 1 and 2

Description

The Shield Building for each Unit is a medium leakage, conventionally reinforced concrete cylinder with a shallow dome roof and a mat foundation. The outside diameter measures 120'-0", the cylinder wall thickness is 2'-6", and the dome roof is 2'-0" thick. The entire height of the structure is 205'-4 1/2" from top of foundation at elevation 693'-0" to top of dome. Each Shield Building encloses the Reactor Containment Vessel, the access openings, the equipment hatch, and that portion of all penetrations that are associated with primary containment. An annular air space of five feet between the walls of the vessel and Shield Building and an air space of approximately seven feet between the top of the vessel and Shield Building dome allows for building maintenance and visual inspection of the Reactor Containment Vessel. The building foundation is a circular mat 134'-0" in diameter. Its thickness varies from 4'-0" to approximately 6'-0" and it is placed on a 4" mud mat and weatherproofing membrane resting on controlled recompacted soils. The mat foundation is common to the Reactor Containment Vessel and also has structural continuity with Auxiliary Building and Turbine Building foundations. Structural continuity is provided by keyed construction joints at building interfaces.

Each Shield Building, with its penetration seals and ventilation system, forms a secondary containment system. Its cylindrical reinforced concrete serves as radiation shielding during normal operation. Following a LOCA, potential fission-product leakage into the annular space between the Shield Building and containment vessel is captured by the Shield Building vent system which continuously filters and recirculates annulus air. Following a LOCA, the Shield Building’s vent system must be capable of bringing the annulus to a negative pressure with respect to the Auxiliary Building, and then maintaining a negative pressure. The Shield Building is primarily a shielding structure and as such it is not subjected to the internal pressure loads of a pressure containment vessel. Minor in-leakage when the vacuum is pulled in the annulus is acceptable, provided the Shield Building exhaust fans can maintain the vacuum.

System Function Listing

A comprehensive listing of functions associated with the Shield Buildings Units 1 and 2, or specific components contained in the structure, is provided in the summary below.

Code SHB-01	Cri 1	Cri 2	Cri 3				
Shield Buildings provide structural support to safety related components.			FP	EQ	PTS	AT	SB
	X						

Comment: Shield Buildings are designed to provide structural support to safety related components relied upon to remain functional during and following design-basis events to ensure satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

Code SHB-02	Cri 1	Cri 2	Cri 3				
Shield Buildings provide flood protection from internal and external flooding events.			FP	EQ	PTS	AT	SB
	X						

Comment: Shield Buildings are designed for and protect against probable maximum flood including buoyant forces against uplift. For external flooding protection, construction joints are keyed and provided with water stops, and ground exposed surfaces of foundation mats are completely enveloped with impermeable waterproofing membranes. Shield Buildings provide flood protection from internal flooding events.

Code SHB-03	Cri 1	Cri 2	Cri 3				
Shield Buildings provide missile protection for externally generated missiles.			FP	EQ	PTS	AT	SB
	X						

Comment: The Shield Buildings are designed to withstand design tornado missile loads in combination with dead and live loads without loss of function. The Shield Buildings are also designed to intercept turbine missiles and prevent them from damaging the Reactor Containment Vessels. Shield Buildings are not subject to internal missiles.

Code SHB-04	Cri 1	Cri 2	Cri 3				
Shield Buildings provide shelter and protection to safety related components.			FP	EQ	PTS	AT	SB
	X						

Comment: Shield Buildings provide shelter and protection to Reactor Containment Vessels and safety related components from direct exposure to the outside environment, from the adverse effects of postulated low temperatures, and from other adverse atmospheric conditions.

Code SHB-05	Cri 1	Cri 2	Cri 3				
Shield Buildings provide shielding against radiation and act as collection chambers for contaminated air.			FP	EQ	PTS	AT	SB
	X						

Comment: Shield Buildings provide radiation shielding and protection for the public from the consequences of a DBE and from parts of the RC System during normal operation. The Shield Buildings in combination with their ventilation systems enable the plant to comply with 10 CFR 100 and 10 CFR 50.67.

The Shield Buildings, although not designed as pressure retaining structures, do serve as collection chambers for any contaminated air which may escape from the Reactor Containment Vessels during a DBE. Each Shield Building's ventilation system provides a means for filtering the contaminated air of the annulus atmosphere and its controlled release. Immediately following a LOCA, the vent exhaust fan, along with the recirculation fan bring the pressure in the Shield Building to slightly negative. This relieves any pressure from thermal expansion that could cause out-leakage through the structure.

Therefore the Shield Buildings are within the scope of License Renewal per 10 CFR 54.4(a)(1).

Code SHB-AT	Cri 1	Cri 2	Cri 3				
Shield Buildings contain SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.62, Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: Shield Buildings house, support, and/or protect equipment required to function in support of the ATWS event and therefore are within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code SHB-FP	Cri 1	Cri 2	Cri 3				
Shield Buildings contain SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: Shield Buildings house, support, and/or protect equipment required to function in support of the FP event. The Shield Buildings' reinforced concrete components provide a fire barrier boundary to stop the spread of fire to adjacent fire areas, and therefore are within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code SHB-NSAS Shield Buildings contain non-safety related SSCs that must maintain sufficient integrity such that the intended function of the safety related SSCs are not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: Shield Buildings provide structural support to non-safety related components whose failure could damage safety related components and prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1), and therefore are within the scope of License Renewal per 10 CFR 54.4(a)(2).

Code SHB-SB Shield Buildings contain SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: Shield Buildings house, support, and/or protect equipment required to function in support of SBO coping and mitigation, and therefore are within the scope of License Renewal per 10 CFR 54.4(a)(3).

USAR Reference

Additional Shield Buildings Units 1 and 2 details are provided in Section 5.3 and Section 12.2 of the USAR.

License Renewal Drawings

The License Renewal drawings for the Shield Buildings Units 1 and 2 are listed below:

Common	Unit 1	Unit 2
LR-193817	None	None

Components/Commodities Subject to an AMR

The components for the Shield Buildings Units 1 and 2 that require an AMR are addressed in Table 2.4.9-1 along with each component's intended function(s).

Table 2.4.9-1 Shield Buildings Units 1 and 2

Components	Intended Function
CONCRETE	DIRECT FLOW FIRE BARRIER FLOOD BARRIER MISSILE BARRIER SHELTER PROTECTION SHIELDING STRUCTURAL SUPPORT
ELASTOMERS	EXPANSION/SEPARATION SHELTER PROTECTION SHIELDING
STAINLESS STEEL COMPONENTS	DIRECT FLOW SHIELDING STRUCTURAL SUPPORT
STEEL COMPONENTS	DIRECT FLOW SHIELDING STRUCTURAL SUPPORT
SUPPORT	STRUCTURAL SUPPORT

2.4.10 Tank Foundations

Description

Seven diesel fuel oil storage tanks are direct buried on site, and are used to supply fuel oil to the D1/D2 diesel generators, two diesel driven cooling water pumps, and a diesel driven fire pump.

Four tanks supplying fuel to the D1/D2 diesel generators are buried east of the Old Service Building. Each 12 foot diameter tank is secured to the 26’-0" by 59’-0" by 1’-0" thick reinforced concrete mat foundation with five hold-down straps. The top of the foundation is at elevation 674’-0", approximately 20 feet below grade. Access to each tank is provided by a buried reinforced concrete pipe 96" in diameter, with a 1’- 2" thick reinforced concrete cover and two manholes access openings located approximately 1" above grade.

Two tanks supplying fuel oil to the diesel driven cooling water pumps are buried east of the Screenhouse. Each 12 foot diameter tank is secured to the 26’-0" by 30’-0" by 1’-0" thick reinforced concrete mat foundation with five hold-down straps. The top of the foundation is at elevation 674’-0", approximately 20 feet below grade. Access to each tank is provided by a buried reinforced concrete pipe 96" in diameter, with a 1’- 2" thick reinforced concrete cover and two manholes access openings located approximately 1" above grade.

The remaining tank supplies fuel oil to the diesel driven fire pump located in the Screenhouse. The 6 foot diameter tank is located just north of the buried diesel driven cooling water pump oil storage tanks. It is secured to the 22’-6" by 8’-0" by 1’-0" thick reinforced concrete mat foundation at elevation 680’-0" with four hold-down straps approximately 14 feet below grade. Tank access is provided in the same manner as the diesel driven cooling water pump oil storage tanks.

There are three condensate storage tanks on site. The #11 Unit 1 storage tank is located east of the Turbine Building, and #21 and #22 Unit 2 storage tanks are located south of the D5/D6 Diesel Generator Building. The condensate storage tanks provide normal and emergency makeup to the CD System, and also provide water for the AF System and suction head to the AF pumps. Each tank is filled with high grade demineralized water from the DE System. Tanks are 30 feet in diameter and 29 feet high with a capacity of 150,000 gallons, and are made of carbon steel. Tanks are supported on 8-sided reinforced concrete slabs on grade, 1’-0" to 1’- 6" thick by approximately 34’-0" in width. Tanks are mounted using concrete expansion anchors, embedded anchors, and/or embedded metal straps.

The fuel oil receiving tank is the piping design anchor point for one 2" pipe and one 3" pipe that are in scope of License Renewal for non-safety affecting safety (i.e. 10 CFR 54.4(a)(2)). The tank is located adjacent to the south wall of the D5/D6 Diesel Generator Building. The fuel oil receiving tank is 12 feet in diameter and over 18 feet tall, and is located on a raised reinforced concrete foundation surrounded by a concrete dike wall approximately 5 feet below grade.

System Function Listing

A comprehensive listing of functions associated with the Tank Foundations, or specific components contained in the structure, is provided in the summary below.

Code TFN-01	Cri 1	Cri 2	Cri 3				
Tank structural components provide structural support to safety related components.			FP	EQ	PTS	AT	SB
	X						

Comment: Concrete foundations and support members provide structural support for safety related tanks and equipment relied upon to remain functional during and following design-basis events to ensure satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

Code TFN-02	Cri 1	Cri 2	Cri 3				
Tank structural components provide missile protection from externally generated missiles.			FP	EQ	PTS	AT	SB
	X						

Comment: The robust design of the reinforced concrete tank access structure and the considerable depth to which the tanks are buried provide protection for safety related tanks and equipment from the effects of tornado generated missiles.

Code TFN-03	Cri 1	Cri 2	Cri 3				
Tank structural components provide shelter and/or protection to safety related components.			FP	EQ	PTS	AT	SB
	X						

Comment: The robust design of the reinforced concrete tank access structure and the considerable depth to which the tanks are buried provide shelter and protection for safety related tanks and equipment from the adverse effects of postulated low temperatures, adverse atmosphere, and environmental conditions.

Code TFN-FP	Cri 1	Cri 2	Cri 3				
Tank structural components support SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: Concrete foundations, support members and access structures support and protect tanks and equipment required to function in support of the FP event and therefore are within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code TFN-NSAS Tank structural components support non-safety related SSCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: Fuel oil receiving tank foundation and support members provide structural support to non-safety related components whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1), and therefore are within the scope of License Renewal per 10 CFR 54.4(a)(2).

Code TFN-SB Tank structural components support SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: Concrete foundations, support members and access structures support and protect tanks and equipment required to function in support of SBO coping and mitigation and therefore are within the scope of License Renewal per 10 CFR 54.4(a)(3).

USAR Reference

Additional Tank Foundations details are provided in Section 10.3 and Section 11.9 of the USAR.

License Renewal Drawings

The License Renewal drawings for the Tank Foundations are listed below:

Common	Unit 1	Unit 2
LR-193817	None	None

Components/Commodities Subject to an AMR

The components for the Tank Foundations that require an AMR are addressed in Table 2.4.10-1 along with each component's intended function(s).

Table 2.4.10-1 Tank Foundations

Components	Intended Function
CONCRETE	MISSILE BARRIER SHELTER PROTECTION STRUCTURAL SUPPORT

Table 2.4.10-1 Tank Foundations

Components	Intended Function
STEEL COMPONENTS	STRUCTURAL SUPPORT
SUPPORT	STRUCTURAL SUPPORT

2.4.11 Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse

Description

Approach Canal

The Approach Canal is a body of water that extends from the main flow of the Mississippi River to the intake screenhouse and is classified as safety related. The canal is 575 feet wide with a flat granular soil bottom originally dredged to elevation 664’-6". A slough angle of 25 to 1 has been observed at the underwater bank which rises from elevation 660.0 ft. to elevation 664.5 ft.

The Approach Canal’s primary purpose is to direct water from the Mississippi River to the intake screenhouse which is located northeast of the powerhouse. The water supplies the safety related cooling water pumps to facilitate plant shutdown.

During normal plant operations, the Approach Canal supplies water to the intake screenhouse. From the intake screenhouse water flows to the plant Screenhouse located just north of the powerhouse. Within the Screenhouse, circulating water bays supply the suction for circulating water pumps. During a postulated DBE, the Approach Canal supplies water to the Emergency Cooling Water Intake line, a submerged 36" diameter pipe and crib structure located west of the shipping channel of the Mississippi River.

Emergency Cooling Water Intake

The Emergency Cooling Water Intake Crib (ECI) is a safety related structure that serves as an inlet to the 36 inch emergency cooling water pipe located in the Approach Canal (a branch channel of the Mississippi River) approximately 800 ft. east of the intake screenhouse. The 36 inch pipe runs from the ECI to the Screenhouse where it supplies the emergency cooling water bay. The purpose of the ECI is to provide an alternate source of cooling water suction for the safety related cooling water pumps located in the Screenhouse needed to maintain safe shutdown of both Units after a DBE.

Structural components of the ECI consist of a 10’-0” (outside diameter, O.D.) x 5’-6” high x 10” wall reinforced concrete vertical entrance conduit. A conical steel trash grating is installed at the open (upper) end, and the structure is supported on a steel bearing pile foundation with a 5’-6” high x 15’-0” O.D. reinforced concrete pile cap. The bearing piles are driven through backfill into granular alluvium. The lower end of the intake conduit is cast into the pile cap concrete, and the Emergency Cooling Water Intake pipe riser extends up through the pile cap.

At the onset of the DBE, the ECI and the Intake Canal both supply suction to the cooling water pumps. The DBE assumes that Lock & Dam No. 3 is destroyed causing the upstream and downstream pools to equalize. Over time the upstream pool level is postulated to decrease to 666’-6”, the normal level of the downstream pool. This provides approximately 4’-6” of submergence above the ECI. Assuming no makeup from the river to the Intake Canal, the volume in the Intake Canal is depleted in approximately 4 hours. After this time, the emergency intake line will be the sole supply of water to the cooling water pumps. After four hours it is necessary for the operators to reduce the CL System flow demand to a value within the capacity of the emergency intake line.

<u>Intake Canal</u>

The Intake Canal is a safety related body of water that extends from the intake screenhouse located northeast of the powerhouse, to the Screenhouse located just north of the powerhouse. The bed of the Intake Canal is unlined earth with earthen embankments and bottom elevation at approximately 664’-6". The earthen embankments are covered with filter blankets and riprap to minimize erosion. Embankment slopes are designed for stability, and rise to an elevation of approximately 692’-0". The normal water level in the Intake Canal is elevation 673’-6". The banks are supplemented by concrete and sheet pile wing walls that extend out from the east and west ends of both screenhouses.

The Intake Canal’s primary purpose is to direct water from the intake screenhouse to the Screenhouse for use as a source of plant cooling water. During normal plant operations, the Intake Canal supplies cooling water suction to the circulating water pumps located in the Screenhouse. During a postulated DBE, the Intake Canal supplies water to the circulating water bays and emergency intake bay located within the Screenhouse where it supplies the safety related cooling water pumps to facilitate plant shutdown.

<u>Screenhouse</u>

The Screenhouse is a stand-alone reinforced concrete and steel framed structure shared by the two Units, and it is located north of the Turbine-Auxiliary-Shield Building complex. Housed within the Screenhouse are circulating water pumps, motor-driven cooling water pumps, fire pumps, screen wash pumps, and safety related cooling water diesel-driven and motor-driven pumps, diesel oil day tank, ventilation system for safety related equipment, and associated piping and equipment. Water flows from the Intake Canal into the Screenhouse past the trash racks and traveling screens, into the cooling water pump bays. At the center of the Screenhouse is the emergency pump bay where safety related cooling water pumps and safety related traveling screens are located. The emergency pump bay provides the access point for the 36" Emergency Cooling Water Intake pipe which enters the bay at the floor level. Two tunnels through the walls of the emergency pump bay allow water from both circulating water pump bays to flow into the emergency bay.

The Screenhouse foundation is approximately 124'-2" (east-west) by 103'-6" (north-south), and the building is supported on a 4'-0" thick reinforced concrete mat foundation placed on a 4" mud mat founded on engineered fill with keyed construction joints and continuous waterstops. Foundation walls are 3'-6" thick and reinforced concrete walls at grade and above are 1'-6" thick. Safety related components are housed within the building’s reinforced concrete structure. Concrete roof and floor slabs protecting safety related components, and roof hatch openings are protected with concrete hatch covers. The reinforced concrete structure is designed to protect safety related components from the adverse effects of postulated low temperatures, atmospheric and environmental conditions, and external missiles. The steel framed structure is located above and supported by the concrete structure. Roofing over the steel framing is constructed from concrete precast channel slabs. Metal siding provides an enclosure for the steel framing.

The reinforced concrete structure and mat foundation are safety related providing shelter and protection to safety related SSCs. The main load carrying structural steel frame is not safety related and is in scope of License Renewal for criterion 10 CFR 54.4(a)(2), non-safety affecting safety since failure could damage safety related SSCs.

System Function Listing

A comprehensive listing of functions associated with the Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse, or specific components contained in the structure, is provided in the summary below.

Code APC-01 The Approach Canal provides a source of cooling water used for plant shutdown.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The Approach Canal is designed to provide a source of cooling water for plant shutdown, and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(1).

The CL System contains required equipment that performs a Fire Protection Safe Shutdown Support Equipment function. The Approach Canal provides a source of cooling water for this required equipment, namely the five cooling water pumps located in the Screenhouse.

Five cooling water pumps, two direct diesel engine driven and three electric motor driven, provide cooling water for a common component cooling loop, the containment ventilation cooling fans, and miscellaneous loads in the Turbine Building and Auxiliary Building.

Code APC-FP The Approach Canal provides a source of water used for SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: The Approach Canal is designed to provide a source of water for fire protection consistent with the Commission’s regulation for Fire Protection (10 CFR 50.48), and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(3).

The FP System contains equipment that is credited in the Fire Hazard Analysis. Components performing this function are supplied with water from the Approach Canal and include two horizontal shaft centrifugal fire pumps. One of the fire pumps is diesel engine-driven and the other is electric motor-driven.

Code APC-SB	Cri 1	Cri 2	Cri 3				
The Approach Canal provides a source of water for SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.			FP	EQ	PTS	AT	SB
							X

Comment: The Approach Canal is designed to provide cooling water to systems credited for SBO coping consistent with the Commission's regulation for Station Blackout (10 CFR 50.63), and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(3).

The CL System provides cooling water to a number of systems credited for SBO event coping. Water for the CL System pumps is supplied by the Approach Canal. Portions of the CL System, necessary to ensure that adequate heat transfer is provided to SBO loads, are in scope for License Renewal.

Code ECI-01	Cri 1	Cri 2	Cri 3				
The Emergency Cooling Water Intake provides structural support to safety related components.			FP	EQ	PTS	AT	SB
	X						

Comment: The Emergency Cooling Water Intake is designed to provide structural support to safety related components relied upon to remain functional during and following design-basis events to ensure satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The purpose of the Emergency Cooling Water Intake is to provide an alternate source of cooling water needed to maintain safe shutdown of both Units after a Design Basis Event.

Code ECI-02	Cri 1	Cri 2	Cri 3				
The Emergency Cooling Water Intake provides a source of cooling water for plant shutdown.			FP	EQ	PTS	AT	SB
	X						

Comment: The Emergency Cooling Water Intake is designed to provide cooling water to plant shutdown components.

At the onset of the Design Basis Event, the safety related Emergency Cooling Water Intake and the Intake Canal both supply suction to the cooling water pumps. The design basis seismic event assumes that Lock & Dam No. 3 is destroyed causing the upstream and downstream pools to equalize. Assuming no makeup from the river to the Intake Canal, the volume in the Intake Canal is depleted in approximately 4 hours. After this time, the Emergency Cooling Water Intake line will be the sole supply of water to the cooling water pumps.

Therefore Emergency Cooling Water Intake is within the scope of License Renewal per 10 CFR 54.4(a)(1).

Code ECI-FP	Cri 1	Cri 2	Cri 3				
The Emergency Cooling Water Intake contains SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: The diesel driven and electric motor driven cooling water pumps take suction in the emergency intake bay from water provided by the Emergency Cooling Water Intake and/or Intake Canal. The CL System is a back-up supply of water to the fire header. Therefore the Emergency Cooling Water Intake performs a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.

Code ECI-NSAS	Cri 1	Cri 2	Cri 3				
The Emergency Cooling Water Intake does not contain non-safety related SSCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.			FP	EQ	PTS	AT	SB

Comment: The Emergency Cooling Water Intake does not contain components designed to provide structural support to non-safety related components whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1), and therefore is not within the scope of License Renewal per 10 CFR 54.4(a)(2).

Code ECI-SB	Cri 1	Cri 2	Cri 3				
The Emergency Cooling Water Intake contains SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.			FP	EQ	PTS	AT	SB
							X

Comment: The emergency cooling water pipe is designed to provide suction to two diesel driven safeguards cooling water pumps located in the emergency intake bay when off-site power is lost. The CL System provides cooling water to a number of systems credited for SBO event coping consistent with the Commission’s regulation for Station Blackout (10 CFR 50.63), and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(3). No credit is taken for flow from the intake screenhouse during SBO initiating event. The Emergency Cooling Water Intake structural components provide support and protection of the emergency cooling water pipe.

Code INC-01	Cri 1	Cri 2	Cri 3				
The Intake Canal provides a source of cooling water used for plant shutdown.			FP	EQ	PTS	AT	SB
	X						

Comment: The Intake Canal is designed to provide a source of cooling water for plant shutdown, and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(1).

The CL System contains required equipment that performs a Fire Protection Safe Shutdown Support Equipment function. The Intake Canal provides a source of cooling water for this required equipment, namely the five cooling water pumps located in the Screenhouse.

Five cooling water pumps, two direct diesel engine driven and three electric motor driven, provide cooling water for a common component cooling loop, the containment ventilation cooling fans, and miscellaneous loads in the Turbine Building and Auxiliary Building.

Code INC-FP	Cri 1	Cri 2	Cri 3				
The Intake Canal provides a source of water used for SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: The Intake Canal is designed to provide a source of water for fire protection consistent with the Commission's regulation for Fire Protection (10 CFR 50.48), and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(3).

The FP System contains equipment that is credited in the Fire Hazard Analysis. Components performing this function are supplied with water from the Intake Canal and include two horizontal shaft centrifugal fire pumps. One of the fire pumps is diesel engine-driven and the other is electric motor-driven. A third electric motor-driven pump, normally assigned to the screen wash function can be aligned to pump into the Fire Water sub-system. On loss of offsite AC power, the diesel driven pump will be available to supply water to the FP System. Pressurization of the Fire Water sub-system is maintained by an electric motor-driven jockey pump.

Code INC-SB The Intake Canal provides a source of water for SSCs relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: The Intake Canal is designed to provide cooling water to systems credited for SBO coping consistent with the Commission's regulation for Station Blackout (10 CFR 50.63), and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(3).

The CL System provides cooling water to a number of systems credited for SBO event coping. Water for CL System pumps is supplied by the Intake Canal. Portions of the CL System, necessary to ensure that adequate heat transfer is provided to SBO loads, are in scope for License Renewal.

Code SCH-01 The Screenhouse provides structural support to safety related components.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The Screenhouse is designed to provide structural support to safety related components relied upon to remain functional during and following design-basis events to ensure satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

Code SCH-02 The Screenhouse provides flood protection from internal and external flooding events.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The Screenhouse is designed to protect safety related components from the effects of flooding, and is therefore within the scope of License Renewal per 10 CFR 54.4(a)(1). The Screenhouse design includes the effects of external hydrostatic loads resulting from a maximum probable flood. Access openings into the Screenhouse subject to flooding are protected with steel bulkheads. Construction joints are keyed and provided with continuous waterstops. The Screenhouse has the capacity to accommodate large internal floods.

Code SCH-03 The Screenhouse provides missile protection for externally generated missiles.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The Screenhouse provides protection to safety related components from the effects of tornado generated missiles and turbine generator missiles. The structure's design includes reinforced concrete walls, floors, and slabs to withstand the effects of missiles without loss of function.

Code SCH-04 The Screenhouse provides shelter and protection to safety related components.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: Various safety related components are housed within the Screenhouse which acts as a safe enclosure providing for protection to safety related components from the adverse effects of postulated low temperatures, adverse atmosphere, and environmental conditions.

Code SCH-05 The Screenhouse provides a source of cooling water for plant shutdown.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: The Screenhouse including the emergency pump bay located within the Screenhouse provide a source of cooling water for plant shutdown.

Code SCH-FP The Screenhouse is relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.48, Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: The Screenhouse houses, supports, and/or protects equipment required to function in support of the FP event such as the diesel-driven fire pump. Walls, ceilings, and floors make up fire areas designed to protect Appendix R safe shutdown equipment from a fire. They provide a fire barrier boundary to stop the spread of fire to adjacent fire areas, and therefore the Screenhouse is within the scope of License Renewal per 10 CFR 54.4(a)(3).

Code SCH-NSAS The Screenhouse contains non-safety related SSCs that must maintain sufficient integrity such that the intended function of the safety related SSC is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The Screenhouse is designed to provide structural support to non-safety related components whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1), and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(2).

Code SCH-SB The Screenhouse is relied upon in safety analysis or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, Station Blackout.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: The Screenhouse houses, supports, and/or protects equipment required to function in support of SBO coping and mitigation and therefore is within the scope of License Renewal per 10 CFR 54.4(a)(3).

USAR Reference

Additional Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse details are provided in Section 10.4 and Section 12.2 of the USAR.

License Renewal Drawings

The License Renewal drawings for the Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse are listed below:

Common	Unit 1	Unit 2
LR-193817	None	None

Components/Commodities Subject to an AMR

The components for the Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse that require an AMR are addressed in Table 2.4.11-1 along with each component's intended function(s).

Table 2.4.11-1 Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse

Components	Intended Function
CONCRETE	DIRECT FLOW FIRE BARRIER FLOOD BARRIER MISSILE BARRIER SHELTER PROTECTION STRUCTURAL SUPPORT
EARTHEN WATER CONTROL STRUCTURES	DIRECT FLOW SHUTDOWN COOLING WATER
ELASTOMERS	FLOOD BARRIER SHELTER PROTECTION
ROOFING	SHELTER PROTECTION

Table 2.4.11-1 Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse

Components	Intended Function
STEEL COMPONENTS	DIRECT FLOW FLOOD BARRIER STRUCTURAL SUPPORT
SUPPORT	STRUCTURAL SUPPORT

2.5 Scoping and Screening Results: Electrical and Instrumentation and Controls Systems

As discussed in Section 2.1.2.7, plant electrical and I&C systems were initially assumed, by default, to be in scope for License Renewal. Table 2.2-1 provides the list of PINGP electrical and I&C systems identified for License Renewal. Components within those systems were then grouped into electrical and I&C commodities. Since components in the electrical and I&C systems were encompassed by the commodity groups, no system level intended functions were identified or considered for the IPA. Therefore, descriptions of the in-scope electrical and I&C systems are not provided. USAR Section 7 and Section 8 provide descriptions of electrical and I&C systems. Further discussion of electrical and I&C scoping and screening results will be provided in the context of their electrical and I&C commodity groups.

Electrical and I&C components in the various commodity groups were then subjected to the screening process described in Section 2.1.3.5. The resulting commodity groups that contain long-lived passive components subject to an AMR are listed below and are discussed in more detail in the identified LRA sections:

- Cables and Connections (Insulation), includes splices, terminations, fuse blocks and connectors (Section 2.5.1)
- Cables and Connections Used in Instrumentation Circuits (Insulation), sensitive to reduction in conductor insulation resistance (Section 2.5.2)
- Inaccessible Medium Voltage Cables and Connections (Insulation), underground, buried (Section 2.5.3)
- Electrical Connector Contacts (metallic connector pins exposed to borated water) (Section 2.5.4)
- Electrical Penetrations (electrical insulation portions) (Section 2.5.5)
- Metal Enclosed Bus and Connections (Bus/Connections, Enclosure Assemblies, Insulation/Insulators) (Section 2.5.6)
- Fuse Holders (metallic parts), not part of a larger active assembly (Section 2.5.7)
- Cable Connections (metallic parts) (Section 2.5.8)
- Switchyard Bus and Connections (Section 2.5.9)
- Transmission Conductors and Connections (Section 2.5.10)
- High-Voltage Insulators (Section 2.5.11)

The electrical commodity groups requiring an AMR, with their respective intended function, are listed in Table 2.5-1.

Structural supports (i.e. instrument racks, panels, cabinets, cable trays, and conduit) for electrical and I&C components are included in the civil/structural assessment. The electrical components' mechanical portions providing a mechanical intended function (i.e. maintain pressure boundary) are included in the mechanical assessment.

Plant equipment in the SBO Recovery Path is in scope of License Renewal and subject to AMR, based upon the guidance provided in Interim Staff Guidance (ISG-02) and incorporated in Section 2.5.2.1.1 of NUREG-1800. This guidance recommends that the plant portion of the offsite power system be included within the scope of License Renewal. ISG-02 states:

"The offsite power systems of U.S. nuclear power plants consist of a transmission system (grid) component that provides a source of power and a plant system component that connects that power source to a plant's onsite electrical distribution system which powers safety equipment.'

The License Renewal scoping boundaries for the SBO recovery paths are consistent with PINGP CLB documentation (USAR Figure 8.2-2), and are shown in License Renewal Boundary Drawing LR-119871. The boundary of the plant equipment in the SBO recovery paths is at the jurisdiction boundary between the site owned equipment and the transmission system equipment as shown in USAR Figure 8.2-2. The jurisdiction boundary is historically well established by plant procedures and drawings, and understood by both PINGP and the transmission system owner. The transmission system side of the jurisdiction boundary is operated and maintained for reliability by the transmission system owner.

The SBO restoration paths also include off-site power supply requirements for Fire Protection. The SBO scoping boundary includes connections from the transmission system to non-safety related buses required to support Fire Protection.

Consistent with the NRC guidance, PINGP includes the switchyard connections to, and the plant equipment associated with, the credited offsite circuits. The credited circuits connecting the offsite transmission network and the onsite Class 1E Electrical Power Distribution System, an independent DG for each safeguards train, and bus ties between Units ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition.

At PINGP, plant system components, up to and including the jurisdiction boundary, are in scope for License Renewal SBO recovery path purposes. The SBO recovery path source boundaries are:

- 1R Transformer (161kV high side disconnect)
- 2RS Transformer (345kV high side disconnects 8H10 and 8H12)

- CT-11 Transformer (No. 1 Cooling Tower Transformer 345kV high side disconnect)
- CT-12 Transformer (13.8kV high side breaker 1H2 source side disconnect)

The major plant components associated with each SBO restoration path are as follows:

PINGP Unit 1

A. 1R Transformer source: 161 kV (Bus 1) Disconnect Switch 89/1R, ACSR conductors, 1R Transformer, metal enclosed bus to safeguards Busses 15 and 16.

B. CT-11 Transformer source: No. 1 Cooling Tower Transformer 345kV high side disconnect, aluminum bus, the No. 1 Cooling Tower Transformer, aluminum bus, Circuit Breaker 1H4, underground insulated cable, 13.8 kV Bus, CT-11 13.8/4.16 kV Transformer, metal enclosed bus, CT 11 Bus, underground insulated cable to safeguards Busses 15 and 16.

PINGP Unit 2

A. 2RS Transformer source: 345kV high side disconnects 8H10 and 8H12, aluminum bus to 2RS Transformer, 2RS Transformer, aluminum bus, Circuit Breaker 2RSY, underground insulated cable, Transformer 2RY, metal enclosed bus to safeguards Busses 25 and 26.

B. CT-12 Transformer source: Circuit Breaker 1H2 high side disconnect, Circuit Breaker 1H2, underground insulated cable, CT-12 13.8/4.16 kV Transformer, metal enclosed

Each of these power sources can power both safeguards busses for both Units using tie breakers.

2.5.1 Cables and Connections (Insulation), Includes Splices, Terminations, Fuse Blocks and Connectors

The insulation material portions subject to aging are reviewed for aging management. Cable jackets provide mechanical protection to the insulation and conductor during the installation process of the cable, and are not relied upon to maintain non-EQ cable insulation integrity. Therefore, no aging review was conducted on cable jackets, nor was any aging credit taken from the cable jackets. The cable insulation material is the only portion subject to aging evaluation.

Splices are used to connect cable conductors to penetration pigtails or to motor leads, and also to connect sections of cables during repair or replacement. The electrical splices (insulation) review includes heat shrink tubing and insulation tape used for the insulation materials in electrical splices.

A terminal block consists of an insulation base with fixed metallic points for landing wires and cables (conductors) or for connecting terminal rings (lugs). The insulating material portions are under review for aging management in this electrical commodity group. Terminal Blocks are installed in enclosures (i.e. panels, control boards, motor control centers, terminal boxes, and junction boxes). Terminal blocks in passive enclosures are in scope of AMR.

Fuse blocks (holders) insulation material are under review for aging management in this electrical commodity group. Metallic clamps (clips) are attached to the blocks to hold each end of the fuse. The clamps could be spring-loaded, or they can be bolt lugs (bolted). Fuse holders not part of a larger active assembly are in scope of AMR.

Electrical connectors are used to connect the cable conductors to other cables or electrical devices. The AMR defined the three main types of connectors as compression, fusion, and plug-in (mated) connectors. A brief description of each is provided below:

A. Compression Connectors: Fittings (e.g. ring lugs or barrels) that are bolted, physically crimped or mechanically swaged to connect cable conductors. The bolted connections are used in metal enclosed bus, large fuses, and internal equipment connections.

B. Fusion Connectors: Cable connections made by welding, brazing or soldering where permanence of the conductor connection is desired.

C. Plug-in (Mated) Connectors: Connectors with one or more electrical contacts that plug or screw into a mating receptacle; useful where ease and frequency of separation of an electrical connection is desired, for ease of mating specific types of equipment and where multiple simultaneous electrical connections need to be made.

The connector insulation material portions are various organic polymers subject to an AMR in this electrical commodity group.

2.5.2 Cables and Connections Used in Instrumentation Circuits (Insulation), Sensitive to Reduction in Conductor Insulation Resistance

Circuits with sensitive, high-voltage, low-level signals (such as radiation monitoring and nuclear instrumentation cables/connections) have less of a tolerance to insulation degradation. Exposure of electrical cables to adverse localized environments caused by heat, radiation or moisture can result in reduced insulation resistance. This reduced insulation resistance causes an increase in leakage currents between conductors and from conductors to ground, which can adversely affect the signal. This degradation can occur without showing any physical signs of degradation.

2.5.3 Inaccessible Medium Voltage Cables and Connections (Insulation), Underground, Buried

Inaccessible medium voltage cables in scope of License Renewal include:

A. SBO restoration path cables and connections

B. Cooling water pump motor cables

C. Screen wash pump motor (fire protection) cables

These medium voltage cables are subject to reduced insulation resistance from the promotion of water trees. The aging mechanisms include long exposures to moisture (buried) and voltage stress (medium voltage application - 2kV-35kV, and normally-energized), and require an AMR.

2.5.4 Electrical Connector Contacts (Metallic Connector Pins Exposed to Borated Water)

Electrical pinned connectors are subject to pin corrosion from borated water leakage, and could lead to electrical failure. Therefore, this electrical commodity group is subject to an AMR.

2.5.5 Electrical Penetrations (Electrical Insulation Portions)

Electrical penetrations entering the containment vessel are in scope of License Renewal. The non-electrical portions of the electrical penetration assemblies, that support the License Renewal pressure boundary or structural function, are addressed by the civil / structural AMRs and are not in scope of the electrical review. The electrical portions of the electrical penetration assemblies that support intended functions are the internal cables (electrical) insulation materials and the connector insulation materials. The cables and connections are subject to an AMR.

2.5.6 Metal Enclosed Bus and Connections (Bus/Connections, Enclosure Assemblies, Insulation/Insulators)

The Metal Enclosed Bus (non-segregated phase bus), supporting the Station Blackout recovery path for PINGP, is in scope of License Renewal and AMR. The structural hardware and enclosure housing components are addressed in the civil / structural reviews.

The main Generator output iso-phase bus duct is not credited as an offsite power source and is not in scope of License Renewal.

2.5.7 Fuse Holders (Metallic Parts), Not Part of a Larger Active Assembly

The fuse holders in scope of License Renewal requiring an AMR are located in passive assemblies/enclosures, such as Panels, Fuse Boxes, Junction Boxes, and Terminal Boxes, and contain metallic clamps (clips) that could be exposed to environments and operating conditions that would lead to either loose connections or corrosion on the connection surfaces and induce a hot spot leading to electrical failure.

2.5.8 Cable Connections (Metallic Parts)

The cable connections (metallic parts) in scope of License Renewal are comprised of various metals, configurations, voltage applications, and operating environments, and require an AMR.

2.5.9 Switchyard Bus and Connections

The 345kV and 161kV switchyard busses that feed in-scope PINGP offsite power supply paths are in scope of License Renewal due to supporting the SBO recovery path. This electrical commodity requires an AMR. Steel structural support hardware is addressed in the civil / structural AMRs.

2.5.10 Transmission Conductors and Connections

The transmission conductor between the last switchyard bus connection and the first PINGP jurisdiction electrical connection to support a SBO recovery path is within the scope of License Renewal. Substation transmission cables include 636 MCM ACSR (aluminum conductor steel reinforced) from disconnect switch 89/1R to 161 kV Bus #1 Transformer 1R (161kV/4.16 kV). Therefore, the high voltage (HV) cables are reviewed for aging effects requiring aging management.

2.5.11 High-Voltage Insulators

The PINGP high-voltage cable insulators and Switchyard Bus post insulators, including the internal metal posts, are in scope of License Renewal. These high voltage insulators physically support a high voltage conductor, isolate the conductor from other conducting components, and allows for predictive movement from environmental conditions. Components that provide a structural function (beyond the insulator “assembly”) are included in the scope of civil/structural AMR.

Table 2.5-1 Electrical and I&C Commodity Groups

Commodity Group	Intended Function
CABLES AND CONNECTIONS (INSULATION), INCLUDES SPLICES, TERMINATIONS, FUSE BLOCKS AND CONNECTORS	ELECTRICAL CONTINUITY
CABLES AND CONNECTIONS USED IN INSTRUMENTATION CIRCUITS (INSULATION), SENSITIVE TO REDUCTION IN CONDUCTOR INSULATION RESISTANCE	
INACCESSIBLE MEDIUM VOLTAGE CABLES AND CONNECTIONS (INSULATION), UNDERGROUND, BURIED	
ELECTRICAL CONNECTOR CONTACTS (METALLIC CONNECTOR PINS EXPOSED TO BORATED WATER)	
ELECTRICAL PENETRATIONS (ELECTRICAL INSULATION PORTIONS)	
METAL ENCLOSED BUS AND CONNECTIONS (BUS/CONNECTIONS, INSULATION/INSULATORS)	
FUSE HOLDERS (METALLIC PARTS), NOT PART OF A LARGER ACTIVE ASSEMBLY	
CABLE CONNECTIONS (METALLIC PARTS)	
SWITCHYARD BUS AND CONNECTIONS	
TRANSMISSION CONDUCTORS AND CONNECTIONS	
HIGH-VOLTAGE INSULATORS (PORCELAIN AND CEMENT)	INSULATE (ELECTRICAL)
METAL ENCLOSED BUS AND CONNECTIONS (INSULATION/INSULATORS)	
METAL ENCLOSED BUS AND CONNECTIONS (ENCLOSURE ASSEMBLIES - SEALS)	EXPANSION / SEPARATION
HIGH-VOLTAGE INSULATORS (STEEL)	STRUCTURAL SUPPORT

Table 2.5-1 Electrical and I&C Commodity Groups

Commodity Group	Intended Function
METAL ENCLOSED BUS AND CONNECTIONS (ENCLOSURE ASSEMBLIES)	SHELTER PROTECTION

3.0 AGING MANAGEMENT REVIEW METHODOLOGY

For those structures and components that are subject to AMR, 10 CFR 54.21(a)(3) of the License Renewal Rule requires demonstration that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the Current Licensing Basis for the period of extended operation.

This section describes the methodology used in the AMRs for those structures and components that were identified in Section 2.0, Scoping and Screening Methodology for Identifying Structures and Components Subject to Aging Management Review, and Implementation Results.

3.0.1 General AMR Methodology

3.0.1.1 AMR Process Overview

The AMR process identifies those aging effects that require management during the period of extended operation and then demonstrates either that the effects of aging will be managed by existing programs or that additional AMP(s)/activities are required to ensure that the structure or component intended function(s) will be maintained during the period of extended operation.

The aging effects and mechanisms that apply to a structure, component or commodity group were determined by the material(s) of construction, operating environment(s), and stressors to which the material is exposed. Structures, components or commodities constructed of the same material and exposed to the same environment are susceptible to the same aging effects and mechanisms. As a result, components were grouped together according to material/environment combinations. This facilitated the AMR process, in that a single AMR could be performed for a specific group of components subject to the same aging effect. Analysis tools provided by Electric Power Research Institute (EPRI) reports, Westinghouse generic topical reports and other industry guidelines were the primary means to identify and evaluate aging effects. Operating experience, both industry and plant-specific, was also used to identify aging effects and to confirm the effectiveness of existing AMPs.

The determination of the AMPs credited for managing aging for the period of extended operation included a review of potential programs. The first choice was to credit programs currently in place at PINGP that manage the effects of aging. If existing programs needed to be supplemented, enhancements were identified to adequately manage the effects of aging. When necessary, new programs were recommended where none previously existed.

TLAAs identified during the AMR process were identified in the AMR Reports. The disposition of each confirmed TLAA is addressed in a separate report as part of the TLAA process.

3.0.1.2 Use of NUREG-1800 and NUREG-1801

NUREG-1800 provides guidance to NRC staff reviewers that perform safety reviews of LRAs in accordance with 10 CFR Part 54. The principal purpose of NUREG-1800 is to ensure the quality and uniformity of staff reviews and to present a well-defined base from which to evaluate applicant programs and activities for the period of extended operation.

NUREG-1801 is the technical basis document for NUREG-1800. NUREG-1801 contains a compilation of AMPs that the NRC has found to be generically acceptable to manage aging during the extended period of operation, based on the results of previous LRA reviews.

NUREG-1801 contains one acceptable way to manage aging effects for License Renewal. An applicant may reference NUREG-1801 in an LRA to demonstrate that the AMPs at the applicant's facility correspond to those reviewed and approved in NUREG-1801 and that no further NRC review is required. An applicant may also propose alternatives for staff review in its LRA.

In general, PINGP chose to manage the effects of aging consistent with those AMPs specified in NUREG-1801. Also, to the extent possible, PINGP has credited existing plant programs and activities to manage aging effects. In those cases where required AMPs did not exist, new AMPs were adopted consistent with the recommendations provided in NUREG-1801.

License Renewal AMP descriptions are provided in Appendix B of this application for each program credited for managing aging effects based upon the AMR results provided in Section 3.1 through 3.6 of this application.

The AMPs described in Appendix B address the ten program elements in accordance with the guidance in Appendix A.1, Section A.1.2.3 of NUREG-1800. Each of the new or existing AMPs described in Appendix B has been evaluated for consistency with the ten elements described in the applicable NUREG-1801, Chapter X or XI program description. Evaluation results are provided for each program to indicate whether the program elements are consistent with, consistent with enhancements, or consistent with exceptions, to the corresponding program description in NUREG-1801.

Appendix B (Section B2.0) also includes a correlation of each NUREG-1801 AMP to the corresponding PINGP AMP, where appropriate. Appendix B includes a brief discussion for those NUREG-1801 AMPs not credited by PINGP.

3.0.1.3 Operating Experience

Operating Experience (OE) is an important resource used to identify Aging Effects Requiring Management (AERM) and to confirm the effectiveness of AMPs. Both PINGP-specific and industry OE records were reviewed to identify information that is related to aging effects and AMPs at PINGP. The relevant OE records were further evaluated as necessary to support the AMR process and the AMP review process.

The primary sources of PINGP-specific OE include:

- Corrective Action Program documents (Condition Reports, Action Requests)
- Maintenance Work Orders
- Licensee Event Reports (LERs)
- System and Program Health Reports
- Self-Assessment Reports
- NRC Inspection Reports
- INPO Evaluation Reports
- Plant Personnel interviews

The primary sources of industry OE include:

- INPO documents (Significant Operating Experience Reports, Significant Event Reports, etc.)
- NRC communications (Generic Letters, Inspection and Enforcement Bulletins, Information Notices, etc.)
- Westinghouse documents

Since the materials and operating environments at PINGP are common to most nuclear power plants, as well as other non-nuclear installations, there is a large amount of available industry OE that is directly applicable to PINGP. These industry OE sources were relied upon to identify the expected aging effects and aging mechanisms applicable to the systems, structures, and components (SSCs) within the scope of License Renewal at PINGP. Among these information sources is NUREG-1801 which provides a compilation of known aging effects/mechanisms based upon a given material and environment combination.

The results of NUREG-1801 are considered current through its publication date of September 2005. Other significant industry sources pertinent to age-related degradation included EPRI reports and Westinghouse generic topical reports.

In addition to the compiled industry OE data, the PINGP Corrective Action Program was relied upon as a significant source of information to confirm the results of the documented industry OE, identify new aging effects, and to provide evidence of the effectiveness of existing programs used to manage aging. The Corrective Action Program includes the evaluation of plant-specific issues such as component degradation and program performance, as well as the evaluation of industry information including a variety of NRC and INPO documents. Corrective Action Program records dating back to January 1, 2000 were electronically searched for keywords associated with age-related degradation. In addition, maintenance work orders dating back to January 1, 2000 and PINGP LERs dating back to initial plant operation were included in the PINGP-specific OE review.

The relevant records were subsequently screened and further evaluated to identify or confirm those aging effects associated with SSCs within the scope of License Renewal at PINGP. The OE records determined to have an impact on License Renewal were also categorized according to License Renewal system and/or AMP, as applicable, using the License Renewal database.

Other valuable sources of PINGP-specific OE, although not included in the License Renewal database, were also queried to ensure a complete and comprehensive OE review was performed. These included the following:

- Recent System Health Reports and Program Health Reports
- Recent NRC Inspection Reports
- INPO Evaluation Reports (2003, 2005)
- Self-Assessment Reports
- Plant Personnel Interviews
- Maintenance Rule Walkdown Inspection Reports

Relevant information from these and other sources was used as an input to the AMR process and in the development of Program Basis Documents (PBDs), as appropriate.

3.0.1.4 Aging Management Review Results - Summary Tables

Preparation of tables summarizing the key results of the AMRs follows the guidance in NEI 95-10, Appendix D. Two types of tables work together to present the needed information to summarize AMRs in a consistent format. These tables are included in Section 3.

As explained in NEI 95-10 (the source of the following information), the 3.x.1 and 3.x.2 tables (Figure 3.0-1 and Figure 3.0-2) summarize each AMR as follows:

- Table 3.x.1 - where '3' indicates the LRA section number, 'x' indicates the subsection number from NUREG-1801, Volume 1, and '1' indicates that this is the first table type in Section 3. For example, in the Reactor Coolant subsection, this table would be number 3.1.1; in the Engineered Safety Features subsection, this table would be 3.2.1, and so on. For ease of discussion, this table is referred to in this section as “Table 1."
- Table 3.x.2-y - where '3' indicates the LRA section number, 'x' indicates the subsection number from NUREG-1801, Volume 1, and '2' indicates that this is the second table type in Section 3; and 'y' indicates the system table number. For example, for the Pressurizer System, within the Reactor Coolant subsection, this table would be 3.1.2-1 and for the Reactor Coolant System, it would be table 3.1.2-2. For the Containment Spray System, within the Engineered Safety Features subsection, this table would be 3.2.2-1. For the next system within the Engineered Safety Feature subsection, it would be table 3.2.2-2. For ease of discussion, this table is referred to in this section as “Table 2."

NUREG-1801 is the NRC Staff's generic evaluation of existing plant programs. It documents the technical basis for determining where existing programs are adequate without modification, and where existing programs should be augmented for the extended period of operation. The evaluation results documented in the report indicate that many of the existing programs are adequate to manage the aging effects for particular structures or components, within the scope of License Renewal, without change. NUREG-1801 also contains recommendations on specific areas for augmentation of existing programs for License Renewal. In order to take full advantage of NUREG-1801, a comparison is made between the AMR results and the tables of NUREG-1801. The results of this comparison are included in the LRA in Tables 1 and 2 as described below.

Table 1 (Figure 3.0-1)

The purpose of Table 1 is to provide a summary comparison of how PINGP aligns with the corresponding tables of NUREG-1801, Volume 1. The table is essentially the same as Tables 1 through 6 provided in NUREG-1801, Volume 1, except that the “ID” and “Type” columns have been replaced by an “Item Number” column and the “Related Generic Item” and “Unique Item” columns have been replaced by a “Discussion” column.

The “Item Number” column provides the reviewer with a means to cross-reference from Table 2 to Table 1.

The “Discussion” column provides clarifying/amplifying information. The following are examples of information that may be contained within this column:

- Further Evaluation Recommended information or reference to where that information is located (including a hyperlink to the information in the LRA if possible).
- The name of a PINGP specific program being used (and a hyperlink to the program if possible).
- Exceptions to the NUREG-1801 assumptions.
- A discussion of how the line is consistent with the corresponding line item in NUREG-1801, Volume 1, when that may not be intuitively obvious.
- A discussion of how the item is different from 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 AMP that is listed in NUREG-1801, Volume 1).

The format of Table 1 provides a means of aligning a specific Table 1 row with the corresponding NUREG-1801, Volume 1 table row.

Table 2 (Figure 3.0-2)

Table 2 provides the detailed results of the AMRs for those components identified in LRA Section 2 as being subject to AMR. There will be a Table 2 for each of the in-scope License Renewal systems within a grouping. For example, for a PWR, the Engineered Safety Features System Group includes tables specific to Containment Spray, Residual Heat Removal, and Safety Injection Systems.

Table 2 consists of the following nine columns:

- Component Type
- Intended Function
- Material

- Environment
- Aging Effect Requiring Management
- Aging Management Programs
- NUREG-1801 Volume 2 Item
- Table 1 Item
- Notes

Component Type

The first column identifies the component types from Section 2 of the LRA that are subject to an AMR.

Intended Function

The second column contains the intended functions (including abbreviations where applicable) for the listed component types.

Material

The third column lists the particular materials of construction for the component type. Materials of construction were identified for systems, structures and components subject to AMR. Sources of information used to identify materials of construction included original equipment and material specifications, vendor technical manuals and drawings, fabrication drawings, piping and instrument drawings, and piping line specifications. Field walkdowns were also used to identify/verify materials of construction for some components.

Environment

The fourth column lists the environment to which the component types are exposed. Descriptions of the service environments used in the AMRs to determine aging effects requiring management are included in Table 3.0-1 for mechanical, Table 3.0-2 for civil, and Table 3.0-3 for electrical.

Aging Effect Requiring Management

As part of the AMR process, the applicant determines any Aging Effect Requiring Management (AERM) for the material and environment combination in order to maintain the intended function of the component type. These aging effects requiring management are listed in column five.

Aging Management Programs

The AMPs used to manage the aging effects requiring management are listed in column six.

NUREG-1801 Volume 2 Item

Each combination of component type, material, environment, aging effect requiring management, and AMP that is listed in Table 2, is compared to NUREG-1801, Volume 2, with consideration given to the standard notes to identify consistencies. When they are identified, they are documented by noting the appropriate NUREG-1801, Volume 2, item number in column seven of Table 2. If there is no corresponding item number in NUREG-1801, Volume 2, this row in column seven is left blank. That way, a reviewer can readily identify where there is correspondence between the plant-specific tables and the NUREG-1801, Volume 2 tables.

Table 1 Item

Each combination of component type, material, environment, aging effect requiring management, and AMP that has an identified NUREG-1801 Volume 2 item number must also have a Table 3.x.1 line item reference number. Column eight of Table 2 lists the corresponding line item from Table 1. If there is no corresponding item in NUREG-1801, Volume 1, this row in column eight is blank. This allows the information from the two tables to be correlated.

Notes

In order to realize the full benefit of NUREG-1801, each applicant needs to identify how the information in Table 2 aligns with the information in NUREG-1801, Volume 2. A series of notes accomplishes this. Note references with letters are standard notes that will be the same from application to application throughout the industry. Numbers identify PINGP specific notes, which are in addition to the standard notes.

3.0.2 Mechanical Aging Management Reviews

The Mechanical AMRs identified and evaluated the aging effects of concern for the passive, long-lived mechanical components within the scope of License Renewal.

3.0.2.1 AMR Groupings

An AMR was conducted for each in-scope mechanical system. There are no mechanical commodity groups.

The aging effects and mechanisms that apply to a structure or component were determined by the material(s) of construction, operating environment(s), and stressors to which the material is exposed. Structures or components constructed of the same material and exposed to the same environment are susceptible to the same aging effects and mechanisms. As a result, on a system basis, components were grouped together according to material/environment combinations. This facilitated the AMR process, in that a single AMR could be performed for a system-specific group of components subject to the same aging effect.

3.0.2.2 Operating Experience Review

After identifying components and structures requiring an AMR and grouping them by material and environment, a review of industry and PINGP-specific operating experience was used to identify ongoing aging effects and mechanisms. Section 3.0.1.3 describes this process.

3.0.2.3 Aging Effects Requiring Management

Mechanical aging effects were determined based on consideration of materials of construction, operating environment and stressors. Analysis tools provided by EPRI reports, Westinghouse generic topical reports and other industry guidelines were the primary means to identify and evaluate aging effects. Operating experience, both industry and plant-specific, was also used to identify aging effects and to confirm the effectiveness of AMPs.

3.0.2.4 Aging Management Activities

Selection of the AMPs to manage the identified aging effects was based on the following:

- PINGP AMP descriptions
- PINGP PBDs
- NUREG-1801

If necessary, new activities and programs were identified, or existing activities and programs enhanced, to assure that aging effects were effectively managed.

3.0.2.5 AMR Reports

An AMR Report was prepared for each mechanical system within the scope of License Renewal. The report used a standard content derived from NEI 95-10.

3.0.2.6 Plant Engineer Reviews

The initial AMR Reports were reviewed by plant engineers. The purpose of the review was to verify that the report was technically accurate and the correct inputs were used. The plant engineers were also requested to identify any plant-specific age-related degradation operating experience or TLAAs, based on their system knowledge.

3.0.3 Civil/Structural Aging Management Reviews

The Civil/Structural AMRs identified and evaluated the aging effects of concern for the passive, long-lived structural components within the scope of License Renewal.

3.0.3.1 AMR Groupings

Civil AMRs were conducted on in-scope plant structures and three structural commodity groups. The components evaluated as structural commodity groups are:

- Cranes, Heavy Loads, Fuel Handling
- Fire protection barriers, and
- Component Supports

3.0.3.2 Operating Experience Review

PINGP-specific and industry operating experience was collected as described in Section 3.0.1.3. Operating experience was used to identify aging effects and mechanisms applicable to in-scope structures and structural commodity groups.

3.0.3.3 Aging Effects Requiring Management

Structural component aging effects were determined based upon consideration of materials of construction, operating environment, and stressors. Analysis tools provided by EPRI reports and other industry guidelines were used to identify and evaluate aging effects. Operating experience, both industry and plant-specific, was also used to identify aging effects and to confirm the effectiveness of AMPs.

3.0.3.4 Aging Management Activities

Selection of the AMPs to manage the identified aging effects was based on the following:

- PINGP AMP descriptions
- PINGP PBDs
- NUREG-1801

If necessary, new activities and programs were identified, or existing activities and programs enhanced, to assure that all aging effects were effectively managed.

3.0.3.5 AMR Reports

AMR Reports were prepared for structures and structural commodity group within the scope of License Renewal.

3.0.3.6 Plant Engineer Reviews

Initial AMR Reports were reviewed by plant engineers. The purpose of the review was to verify that the report was technically accurate and the correct inputs were used. The plant engineers were also requested to identify any plant-specific age-related degradation operating experience or TLAAs, based on their system knowledge.

3.0.4 Electrical Aging Management Reviews

The AMRs for electrical AMR commodity groups identified and evaluated the aging effects of concern for the passive, long-lived electrical components within the scope of License Renewal.

3.0.4.1 AMR Commodity Groups

To facilitate the AMR, electrical components were grouped so that a single AMR could be performed for the entire commodity group. Evaluation of the components within these groups, referred to as AMR commodity groups, was based on the pertinent common characteristics of the components in the group, such as materials and environment. Research has shown that the aging effects are largely a function of the materials of the component and the environments to which they are exposed. Pairing a commodity with an environment defines an AMR commodity group. An AMR report was prepared to address the electrical commodity groups.

3.0.4.2 Operating Experience Review

The materials used for electrical components at PINGP are common to nuclear power plants and to many non-nuclear power plants that have long operating histories. A significant body of industry operating data exists as described in Section 3.0.1.3. Operating experience was used to identify aging effects and mechanisms applicable to PINGP electrical components.

3.0.4.3 Aging Effects Requiring Management

Electrical component aging effects were determined based upon consideration of materials of construction, operating environment, and stressors. The composition of components subject to an AMR, and the environments they are subjected to, were determined by reviewing pertinent design documents, DBD source documents, drawings, CLB, specifications, vendor manuals, etc. For electrical components, the limiting environmental parameters include temperature, radiation, and moisture.

The aging effects likely to occur for the given material/environment combinations were identified from the following sources:

- EPRI Guidelines
- PINGP Environmental Qualification Program
- Applicable vendor documents
- NUREG-1801

3.0.4.4 Aging Management Activities

Selection of the AMPs to manage the identified aging effects was based on the following:

- PINGP AMP descriptions
- PINGP PBDs
- NUREG-1801

If necessary, new activities and programs were identified, or existing activities and programs enhanced, to assure that aging effects were effectively managed.

3.0.4.5 AMR Reports

An AMR Report was prepared for electrical AMR commodity groups within the scope of License Renewal.

3.0.4.6 Plant Engineer Reviews

The initial Electrical AMR Report was reviewed by plant engineers. The purpose of the review was to verify that the report was technically accurate and the correct inputs were used. The plant engineers were also requested to identify any plant-specific age-related degradation operating experience, based on their system knowledge.

Table 3.0-1 Mechanical Service Environments

PINGP Environment	AMR Environment Group	Discussion
Primary Containment Air Plant Indoor Air - Uncontrolled Dry/Filtered Instrument Air Nitrogen Gas Carbon Dioxide Gas Hydrogen Gas Halon Gas Freon Gas Diesel Exhaust Wet Air/Gas	Air/Gas	This environment includes Primary Containment air, plant indoor air - uncontrolled, dry/filtered instrument air, nitrogen, carbon dioxide, hydrogen, halon, freon gas, diesel exhaust, and wet air/gas. Conditions for this environment may include borated water leakage, humidity, condensation, UV exposure, ozone and contaminants. The Primary Containment is protected from weather and includes ambient temperatures between 50°F and 120°F (USAR Section 1.2.7). Thermal hot spots may exist within the Primary Containment and are addressed in the applicable AMR. The plant indoor areas are protected from weather and include ambient temperatures between 60°F to 125°F (USAR Section 10.3.2.1 and Section 10.3.12.2). Thermal hot spots may exist within the plant and are addressed in the applicable AMR. Borated water leakage can result in the concentration of boric acid crystals on the external surface of components that can aggressively attack the material. Borated water leakage may exist within Auxiliary (excluding the relay/computer room, control room, and control room ventilation equipment room), Containment and Radwaste Buildings.

Table 3.0-1 Mechanical Service Environments

PINGP Environment	AMR Environment Group	Discussion
Outdoor Air - Sheltered Outdoor Air - Not Sheltered	Atmosphere/Weather	This environment includes outdoor air (sheltered and not sheltered). Conditions for this environment may include humidity, precipitation, UV exposure, ozone and wind. The environments covered by this group include areas exposed to atmospheric conditions and weather with temperatures ranging from -35°F to 100°F (USAR Figure 2.3-1A). Conditions may be either protected or un-protected from precipitation and UV exposure.
Lubricating Oil Fuel Oil Hydraulic Oil	Oil	This environment includes fuel oil, hydraulic oil, and lubricating oil.
Raw Water Buried	Raw Water	This environment includes raw water, areas exposed to water that leaks from any system and damp soils (moist soil/earth) containing groundwater (i.e. buried in ground). This environment is defined as water that enters the plant from a river, lake, pond, or rain/groundwater source that has not been demineralized or chemically treated to any significant extent. In general, the water is rough-filtered to remove large particles. Biocides may be added to control micro-organisms or macro-organisms.
Treated Water Steam	Treated Water and/or Steam	This environment includes water environments that start as demineralized water. Steam generated from Treated Water is included in this group. Treated Water can be further processed (deionized, deaerated), include corrosion inhibitors, biocides, and boric acid, or include some combinations of these treatments.

Table 3.0-2 Civil Service Environments

PINGP Environment	AMR Environment Group	Discussion
Air Indoor	Air Indoor	The Air Indoor environment is Primary Containment air and plant indoor air. Conditions for this environment may include humidity, condensation, UV exposure, ozone and contaminants. The Primary Containment is protected from weather and includes ambient temperatures between 50°F and 120°F (USAR Section 1.2.7). Thermal hot spots may exist within the Primary Containment and are addressed in the applicable AMR. The plant indoor areas are protected from weather and include ambient temperatures between 60°F to 125°F (USAR Section 10.3.2.1 and Section 10.3.12.2). Thermal hot spots may exist within the plant and are addressed in the applicable AMR.

Table 3.0-2 Civil Service Environments

PINGP Environment	AMR Environment Group	Discussion
Air with Borated Water Leakage	Air with Borated Water Leakage	The Air with Borated Water Leakage is Primary Containment air and plant indoor air with borated water leakage. Conditions for this environment may include humidity, condensation, UV exposure, ozone and contaminants. The Primary Containment is protected from weather and includes ambient temperatures between 50°F and 120°F (USAR Section 1.2.7). Thermal hot spots may exist within the Primary Containment and are addressed in the applicable AMR. The plant indoor areas are protected from weather and include ambient temperatures between 60°F to 125°F (USAR Section 10.3.2.1 and Section 10.3.12.2). Thermal hot spots may exist within the plant and are addressed in the applicable AMR. Borated water leakage can result in the concentration of boric acid crystals on the external surface of components that can aggressively attack the material. Borated water leakage may exist within the Auxiliary Building (excluding the relay/computer room, control room, and control room ventilation equipment room), Containments, Radwaste Building, and Shield Buildings.
Air Outdoor	Air Outdoor	The Air Outdoor environment is outdoor air (sheltered and not sheltered). Conditions for this environment may include humidity, precipitation, UV exposure, ozone and wind. The environment includes areas exposed to atmospheric conditions and weather with temperatures ranging from -35°F to 100°F (USAR Figure 2.3-1A). Conditions may be either protected or un-protected from precipitation and UV exposure.

Table 3.0-2 Civil Service Environments

PINGP Environment	AMR Environment Group	Discussion
Groundwater/Soil	Groundwater/Soil	The Groundwater/Soil environment is exposed to damp soils (moist soil/earth) containing groundwater (i.e. buried in ground).
Groundwater/Soil (Accessible)	Groundwater/Soil (Accessible)	The Groundwater/Soil (Accessible) environment is submerged in raw water and accessible for examination. Raw water is defined as water from a river, lake, pond, or rain/groundwater source that has not been demineralized or chemically treated to any significant extent.
Treated Borated Water	Treated Borated Water	The Treated Borated Water environment is borated water environments that start as demineralized water.
Embedded in Concrete	Embedded in Concrete	The Embedded in Concrete environment is embedded (encased) in concrete.

Table 3.0-3 Electrical Service Environments

PINGP Environment	AMR Environment Group	Discussion
Adverse Localized Environment	Adverse Localized Environments	Adverse localized environment is a condition in a limited plant area, containing electrical commodities (mainly cables and connections), that is more severe than the specified service condition for the electrical commodity. Adverse Localized Environment conditions may include chemical contamination, corrosion, electrical transients, heat (in the presence of oxygen), mechanical stresses, moisture (in the presence of oxygen), ohmic heating, oxidation, radiation (in the presence of oxygen), thermal cycling (power applications) and vibration.
Air/Gas	Air/Gas	The Air/Gas environment includes Primary Containment air and plant indoor air (controlled and uncontrolled). Air/Gas conditions may include humidity, condensation and contaminants. The Primary Containment is protected from weather and includes bounding ambient temperatures between 105°F and 120°F used for electrical commodities AMR. Thermal hot spots may exist within the Primary Containment and are addressed in the applicable AMRs. The plant indoor areas are protected from weather and include a bounding ambient temperature of 105°F used for electrical commodities AMR. Thermal hot spots may exist within the plant and are addressed in the applicable AMRs.

Table 3.0-3 Electrical Service Environments

PINGP Environment	AMR Environment Group	Discussion
Atmosphere/Weather	Atmosphere/Weather	The Atmosphere/Weather environment includes outdoor air (sheltered and not sheltered). Atmosphere/Weather conditions may include humidity, precipitation and wind. The environments covered by this group include areas exposed to atmospheric conditions and weather with temperatures ranging from -35°F to 100°F (USAR Figure 2.3-1A). Conditions may be either protected or un-protected from precipitation and UV exposure.
Borated Water Leakage	Borated Water Leakage	Borated water leakage can result in the concentration of boric acid crystals on the external surface of components that can aggressively attack the material. Borated water leakage may exist within Auxiliary (excluding the relay/computer room, control room, and control room ventilation equipment room), Containment and Radwaste Buildings.
Mechanical Cycling	Mechanical Cycling	Fuse Holders (Metallic parts - clips) having frequent cycling of fuses (removal/ reinstallation) greater than once per year could relax/fatigue the clips leading to loose connections.

Table 3.0-3 Electrical Service Environments

PINGP Environment	AMR Environment Group	Discussion
Moisture (Raw Water) and Voltage Stress	Moisture (Raw Water) and Voltage Stress	Exposure to moisture and voltage stress is described as raw water environment with voltage stress. The Raw Water environment includes raw water, areas exposed to water that leaks from any system and damp soils (moist soil/earth) containing groundwater (i.e. buried in ground). Raw Water is defined as water that enters the plant from a river, lake, pond, or rain/ground water source that has not been demineralized or chemically treated to any significant extent. In general, the water is rough-filtered to remove large particles. Biocides may be added to control microorganisms or macro-organisms. Voltage stress for medium voltage cables is present when energized at least 25% of the time.

Figure 3.0-1 Table 1 -
Table 3.x.1, Summary of Aging Management Evaluations in Chapter _____ of NUREG-1801 for ____________

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.x.1-01					
3.x.1-02					
3.x.1-03					
3.x.1-04					
3.x.1-05					
3.x.1-06					

Figure 3.0-2 Table 2 -
Table 3.x.2-y, Section 3 Title - Plant Specific System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes

3.1 Aging Management of Reactor Vessel, Internals, and Reactor Coolant System

3.1.1 Introduction

This section provides the results of the AMR for those components identified in Section 2.3.1, Reactor Vessel, Internals, and Reactor Coolant System, as being subject to an AMR. The systems, or portions of systems, which are addressed in this section, are described in the indicated sections.

- Pressurizer System (Section 2.3.1.1)
- Reactor Coolant System (Section 2.3.1.2)
- Reactor Internals System (Section 2.3.1.3)
- Reactor Vessel System (Section 2.3.1.4)
- Steam Generator System (Section 2.3.1.5)

Table 3.1.1, Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System, provides the summary of the programs evaluated in NUREG-1801 for the Reactor Vessel, Internals, and Reactor Coolant System components that are relied on for License Renewal. This table uses the format described in Section 3.0. Note that this table only includes those components that are applicable to a PWR.

3.1.2 Results

The following tables summarize the results of the AMR for systems in the Reactor Vessel, Internals, and Reactor Coolant System group:

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

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

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

Table 3.1.2-4, Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Table 3.1.2-5, Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

The materials that specific components are fabricated from, the environments to which components are exposed, the potential aging effects requiring management, and the AMPs used to manage these aging effects are provided for each of the above systems in the following subsections of Section 3.1.2.1, Materials, Environment, Aging Effects Requiring Management and Aging Management Programs:

Section 3.1.2.1.1, Pressurizer System

Section 3.1.2.1.2, Reactor Coolant System

Section 3.1.2.1.3, Reactor Internals System

Section 3.1.2.1.4, Reactor Vessel System

Section 3.1.2.1.5, Steam Generator System

3.1.2.1 Materials, Environment, Aging Effects Requiring Management and Aging Management Programs

3.1.2.1.1 Pressurizer System

Materials

The materials of construction for the PS System are:

- Carbon Steel
- Carbon Steel with Stainless Steel Clad
- Carbon Steel with Stainless Steel Insert
- Cast Austenitic Stainless Steel
- Nickel Alloy
- Stainless Steel

Environment

The PS System components are exposed to the following environments:

- Primary Containment Air (External)
- Treated Water (External)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the PS System, require management:

- Cracking - Cyclic Loading
- Cracking - Primary Water Stress Corrosion Cracking
- Cracking - Stress Corrosion Cracking (SCC)

- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Pitting Corrosion
- Loss of Preload - Thermal, Gasket Creep, Loosening
- Reduction of Fracture Toughness - Thermal Embrittlement

Aging Management Programs

The following AMPs manage the aging effects for the PS System components:

- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program
- Bolting Integrity Program
- Boric Acid Corrosion Program
- Nickel-Alloy Nozzles and Penetrations Program
- One-Time Inspection Program
- Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program
- Water Chemistry Program

3.1.2.1.2 Reactor Coolant System

Materials

The materials of construction for the RC System are:

- Bronze
- Carbon Steel
- Cast Austenitic Stainless Steel
- Cast Iron
- Copper Alloy
- Stainless Steel

Environment

The RC System is exposed to the following environments:

- Lubricating Oil (Internal)
- Nitrogen Gas (Internal)
- Plant Indoor Air - Uncontrolled (External)

- Primary Containment Air (External)
- Primary Containment Air (Internal)
- Steam (Internal)
- Treated Water (External)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the RC System, require management:

- Cracking - SCC/IGA
- Heat Transfer Degradation - Fouling
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening
- Reduction of Fracture Toughness - Thermal Embrittlement

Aging Management Programs

The following AMPs manage the aging effects for the RC System:

- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program
- Bolting Integrity Program
- Boric Acid Corrosion Program
- Closed-Cycle Cooling Water System Program
- External Surfaces Monitoring Program
- Lubricating Oil Analysis Program
- One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program
- One-Time Inspection Program
- Selective Leaching of Materials Program

- Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program
- Water Chemistry Program

3.1.2.1.3 Reactor Internals System

Materials

The materials of construction for the RX System are:

- Cast Austenitic Stainless Steel
- Nickel Alloy
- Stainless Steel

Environment

The RX System components are exposed to the following environments:

- Primary Containment Air (Internal)
- Treated Water (External)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the RX System, require management:

- Changes in Dimensions - Void Swelling
- Cracking - Irradiation-Assisted Stress Corrosion Cracking
- Cracking - Primary Water Stress Corrosion Cracking
- Cracking - Stress Corrosion Cracking (SCC)
- Loss of Material - Crevice Corrosion
- Loss of Material - Pitting Corrosion
- Loss of Material - Wear
- Loss of Preload - Stress Relaxation
- Reduction of Fracture Toughness - Radiation Embrittlement
- Reduction of Fracture Toughness - Thermal Embrittlement
- Reduction of Fracture Toughness - Void Swelling

Aging Management Programs

The following AMPs manage the aging effects for the RX System components:

- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program
- Flux Thimble Tube Inspection Program
- PWR Vessel Internals Program
- Water Chemistry Program

3.1.2.1.4 Reactor Vessel System

Materials

The materials of construction for the RV System are:

- Carbon Steel
- Carbon Steel with Stainless Steel Clad
- Nickel Alloy
- Stainless Steel

Environment

The RV System components are exposed to the following environments:

- Primary Containment Air (External)
- Treated Water (External)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the RV System, require management:

- Cracking - Primary Water Stress Corrosion Cracking
- Cracking - SCC/IGA
- Cracking - Stress Corrosion Cracking (SCC)
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Pitting Corrosion
- Loss of Material - Wear
- Reduction of Fracture Toughness - Radiation Embrittlement

Aging Management Programs

The following AMPs manage the aging effects for the RV System components:

- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program
- Boric Acid Corrosion Program
- Nickel-Alloy Nozzles and Penetrations Program
- Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program
- Reactor Head Closure Studs Program
- Reactor Vessel Surveillance Program
- Water Chemistry Program

3.1.2.1.5 Steam Generator System

Materials

The materials of construction for the SG System are:

- Carbon Steel
- Carbon Steel with Nickel-Alloy Clad
- Carbon Steel with Stainless Steel Clad
- Carbon Steel with Stainless Steel Insert
- Nickel Alloy
- Stainless Steel

Environment

The SG System is exposed to the following environments:

- Primary Containment Air (External)
- Steam (External)
- Steam (Internal)
- Treated Water (External)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the SG System, require management:

- Cracking - Intergranular Attack
- Cracking - Outer Diameter Stress Corrosion Cracking
- Cracking - Primary Water Stress Corrosion Cracking
- Cracking - SCC/IGA
- Denting - Corrosion of Carbon Steel Tube Support Plate
- Heat Transfer Degradation - Fouling
- Ligament Cracking - Corrosion
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Erosion
- Loss of Material - FAC
- Loss of Material - Fretting
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - Pitting Corrosion
- Loss of Material - Wear
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the SG System components:

- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program
- Bolting Integrity Program
- Boric Acid Corrosion Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Steam Generator Tube Integrity Program
- Water Chemistry Program

3.1.2.2 Further Evaluation of Aging Management as Recommended by NUREG-1801

NUREG-1801 Volume 1 Tables provide the basis for identifying those programs that warrant further evaluation by the reviewer in the LRA. For the Reactor Vessel, Internals, and Reactor Coolant System, those programs are addressed in the following sections.

3.1.2.2.1 Cumulative Fatigue Damage

NUREG-1800 and NUREG-1801 identify this line item as applicable to BWRs only. However, unique items IV.A1-6 (BWR) and IV.A2-20 (PWR) apply. The PINGP reactor vessel does not have a support skirt. Fatigue of the primary nozzle support pads and the pressurizer support skirt and flange is a TLAA as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). This TLAA is addressed in Section 4.3 of the LRA.

Fatigue of selected reactor vessel internals components is a TLAA as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). The PINGP reactor vessel internals were originally designed prior to specific design requirements for RV internals in ASME III and calculation of cumulative fatigue damage was not required. In the mid 1980s the upper internals were replaced on both Units 1 and 2. Fatigue is a TLAA for the replacement upper internals and is addressed in Section 4.3 of the LRA.

Fatigue of the replacement steam generator (RSG) tubes is a TLAA as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). The PINGP steam generator tubes were evaluated for fatigue in accordance with ASME III. This TLAA is addressed in Section 4.3 of the LRA.

Fatigue of the reactor head closure studs, steam generator components, and steam generator secondary closure bolting is a TLAA as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). The PINGP reactor head closure studs, steam generator components, and steam generator secondary closure bolting were evaluated for fatigue. This TLAA is addressed in Section 4.3 of the LRA.

Fatigue of reactor coolant pressure boundary components is a TLAA as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). These TLAAs are addressed in Section 4.3 of the LRA.

Fatigue of reactor vessel components is a TLAA as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). These TLAAs are addressed in Section 4.3 of the LRA.

Fatigue of steam generator components is a TLAA as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). These TLAAs are addressed in Section 4.3 of the LRA.

3.1.2.2.2 Loss of Material due to General, Pitting, and Crevice Corrosion

1. NUREG-1800 and NUREG-1801 state that this item is applicable to all PWRs. However, line item IV.D2-8 (R-244) applies to PWR once-through steam generators only. PINGP does not have once-through steam generators. See line item 3.1.1-16 for further discussion.
2. BWR Only
3. BWR Only
4. Loss of material due to general, pitting and crevice corrosion could occur for steel steam generator upper and lower shell and transition cone exposed to secondary feedwater and steam. This aging effect is managed with a combination of the Water Chemistry Program and the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program (IWB, IWC, and IWD Program) includes periodic visual, surface, and/or volumetric examinations of Class 1, 2, and 3 pressure-retaining components, their welded integral attachments, and bolting. Leakage tests are periodically performed on Class 1, 2, and 3 pressure-retaining components. The program also provides component repair and replacement requirements in accordance with ASME Section XI. The provisions of ASME Section XI are augmented by additional inspections to detect general and pitting corrosion on the shell to transition cone weld of the Westinghouse Model 51 steam generators in Unit 2. Westinghouse Model 51 steam generators have a high stress region at the shell to transition cone weld, and corrosion of the steam generator shell is known to exist. These programs assure the intended function of affected

components will be maintained during the period of extended operation. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.

3.1.2.2.3 Loss of Fracture Toughness due to Neutron Irradiation Embrittlement

1. 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). There are no TLAAs for the PINGP reactor vessel nozzles. In addition, the PINGP reactor vessel nozzles will receive fluence less than 1.0E17 n/cm^2 at 60-years and loss of fracture toughness is not an applicable aging effect for the RV nozzles. The reactor vessel shell beltline has TLAAs that include Appendix G of 10 CFR 50 and 10 CFR 50.61. This TLAA is addressed in Section 4.2 of the LRA.
2. Loss of fracture toughness due to neutron irradiation embrittlement could occur for steel (with or without stainless steel cladding) reactor vessel beltline shell, nozzles, and welds and safety injection nozzles. This aging effect is managed with the Reactor Vessel Surveillance Program. The Reactor Vessel Surveillance Program includes surveillance capsule removal and specimen mechanical testing/evaluation, radiation analysis, development of pressure-temperature limits, and determination of low-temperature overpressure protection (LTOP) setpoints. The program ensures that reactor vessel materials meet the requirements of 10 CFR 50.60 for fracture prevention and the requirements of 10 CFR 50.61 for Pressurized Thermal Shock (PTS). This program assures the intended function of affected components will be maintained during the period of extended operation.

3.1.2.2.4 Cracking due to Stress Corrosion Cracking (SCC) and Intergranular Stress Corrosion Cracking (IGSCC)

1. BWR Only
2. BWR Only

3.1.2.2.5 Crack Growth due to Cyclic Loading

Crack growth due to cyclic loading associated with underclad cracking of the RV shell is a TLAA as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). This TLAA is addressed in Section 4.7.2 of the LRA.

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 for stainless steel and nickel alloy reactor internals components exposed to reactor coolant and neutron flux. This aging effect is managed with the PWR Vessel Internals Program. For the PWR Vessel Internals Program, PINGP commits to the following activities for managing the aging of reactor vessel internals components (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 program assures the intended function of affected components will be maintained during the period of extended operation.

3.1.2.2.7 **Cracking due to Stress Corrosion Cracking**

1. Cracking due to stress corrosion cracking could occur for stainless steel reactor vessel closure head flange leak detection line and bottom-mounted instrument guide tubes. This aging effect is managed with the Water Chemistry Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. This program assures the intended function of affected components will be maintained during the period of extended operation.

2. Cracking due stress corrosion cracking could occur for Class 1 cast austenitic stainless steel piping, piping components, and piping elements exposed to reactor coolant. This aging effect is managed with a combination of the Water Chemistry Program and the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD

Program (IWB, IWC, and IWD Program) includes periodic visual, surface, and/or volumetric examination of Class 1, 2, and 3 pressure-retaining components, their welded integral attachments, and bolting. Leakage tests are periodically performed on Class 1, 2, and 3 pressure-retaining components. The program also provides component repair and replacement requirements in accordance with ASME Section XI. These programs assure the intended function of affected components will be maintained during the period of extended operation.

3.1.2.2.8 Cracking due to Cyclic Loading

1. BWR Only
2. BWR Only

3.1.2.2.9 Loss of Preload due to Stress Relaxation

Loss of preload due to stress relaxation could occur for nickel alloy and stainless steel reactor internals components. This aging effect is managed with the PWR Vessel Internals Program. For the PWR Vessel Internals Program, PINGP commits to the following activities for managing the aging of reactor vessel internals components (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 program assures the intended function of affected components will be maintained during the period of extended operation.

3.1.2.2.10 Loss of Material due to Erosion

Loss of material due to erosion could occur for steel steam generator feedwater impingement plate and support exposed to secondary feedwater. The PINGP steam generators do not have steam generator feedwater impingement plates and supports.

3.1.2.2.11 Cracking due to Flow-Induced Vibration

BWR Only

3.1.2.2.12 **Cracking due to Stress Corrosion Cracking and Irradiation-Assisted Stress Corrosion Cracking (IASCC)**

Cracking due to stress corrosion cracking and irradiation-assisted stress corrosion cracking could occur for stainless steel reactor internals components. This aging effect is managed with a combination of the Water Chemistry Program and the PWR Vessel Internals Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. For the PWR Vessel Internals Program, PINGP commits to the following activities for managing the aging of reactor vessel internals components (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 program assures the intended function of affected components will be maintained during the period of extended operation.

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

Cracking due to primary water stress corrosion cracking could occur for nickel alloy reactor internals components. This aging effect is managed with a combination of the Water Chemistry Program, the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program and the Nickel-Alloy Nozzles and Penetrations Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program (IWB, IWC, and IWD Program) includes periodic visual, surface, and/or volumetric examination of Class 1, 2, and 3 pressure-retaining components, their welded integral attachments, and bolting. Leakage tests are periodically performed on Class 1, 2, and 3 pressure-retaining components. The program also provides component repair and replacement requirements in accordance with ASME Section XI. For the

Nickel-Alloy Nozzles and Penetrations Program, PINGP commits to the following activities for managing the aging of nickel-alloy components susceptible to primary water stress corrosion cracking: (1) comply with applicable NRC orders, and (2); implement applicable NRC Bulletins, Generic Letters, and staff-accepted industry guidelines. These programs assure the intended function of affected components will be maintained during the period of extended operation.

3.1.2.2.14 Wall Thinning due to Flow-Accelerated Corrosion

Wall thinning due to flow-accelerated corrosion could occur for feedwater inlet ring and supports. The PINGP S/G feedwater inlet rings and supports do not perform a License Renewal intended function. The inlet rings are not safety related and are located above the tube bundle wrapper transition cone roof and are therefore isolated from impacting the U-tubes.

3.1.2.2.15 Changes in Dimensions due to Void Swelling

Changes in dimensions due to void swelling could occur for stainless steel and nickel alloy reactor internals components. This aging effect is managed by the PWR Vessel Internals Program. For the PWR Vessel Internals Program, PINGP commits to the following activities for managing the aging of reactor vessel internals components (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 program assures the intended function of affected components will be maintained during the period of extended operation.

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

1. PART I

   Cracking due to stress corrosion cracking could occur for stainless steel CRDM rod travel housings. This aging effect is managed with a combination of the Water Chemistry Program and the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program (IWB, IWC, and IWD Program) includes periodic visual, surface, and/or volumetric examination of Class 1, 2, and 3 pressure-retaining components, their welded integral attachments, and bolting. Leakage tests are periodically performed on Class 1, 2, and 3 pressure-retaining components. The program also provides component repair and replacement requirements in accordance with ASME Section XI. These programs assure the intended function of affected components will be maintained during the period of extended operation.

PART II

NUREG-1800 and NUREG-1801 state that this item is applicable to all PWRs. However, line item IV.D2-4 (R-35) applies to PWR once-through steam generators only. PINGP does not have once-through steam generators. See line items 3.1.1-81 and 3.1.1-82 for further discussion.

2. Cracking due to stress corrosion cracking and primary water stress corrosion cracking could occur for cast austenitic stainless steel pressurizer spray heads. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation.

3.1.2.2.17 Cracking due to Stress Corrosion Cracking, Primary Water Stress Corrosion Cracking, and Irradiation-Assisted Stress Corrosion Cracking

Cracking due to stress corrosion cracking, primary water stress corrosion cracking, and irradiation-assisted stress corrosion cracking could occur for stainless steel and nickel alloy reactor internals components. This aging effect is managed with a combination of the Water Chemistry Program and the PWR Vessel Internals Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. For the PWR Vessel Internals Program, PINGP commits to the following activities for managing the aging of reactor vessel internals components (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. These programs assure the intended function of affected components will be maintained during the period of extended operation.

3.1.2.3 Time-Limited Aging Analyses

The TLAAs identified below are associated with the Reactor Vessel, Internals, and Reactor Coolant System components. The section of the LRA that contains the TLAA review results is indicated in parenthesis.

- Reactor Vessel Neutron Embrittlement (Section 4.2)
- Metal Fatigue (Section 4.3)
- RCS Piping Leak-Before-Break Analyses (Section 4.7.1)
- Reactor Vessel Underclad Cracking (Section 4.7.2)
- Reactor Coolant Pump Flywheel (Section 4.7.3)

3.1.3 Conclusion

The Reactor Vessel, Internals, and Reactor Coolant System piping, fittings, and components that are subject to an AMR have been identified in accordance with the requirements of 10 CFR 54.4. The AMPs selected to manage aging effects for the Reactor Vessel, Internals, and Reactor Coolant System components are identified in the summary tables and Section 3.1.2.1.

A description of these AMPs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation.

Therefore, based on the conclusions provided in Appendix B, the effects of aging associated with the Reactor Vessel, Internals, and Reactor Coolant System components will be adequately managed so that there is reasonable assurance that the intended function(s) 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 Reactor Vessel, Internals, and Reactor Coolant System

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	Fatigue of metal components is addressed as a TLAA. Further evaluation is documented in Section 3.1.2.2.1.
3.1.1-02	BWR Only				
3.1.1-03	BWR Only				
3.1.1-04	BWR Only				
3.1.1-05	Stainless steel and nickel alloy reactor vessel internals components	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Fatigue of metal components is addressed as a TLAA. 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 (	Fatigue of metal components is addressed as a TLAA. Further evaluation is documented in Section 3.1.2.2.1.
3.1.1-07	Steel and stainless steel reactor coolant pressure boundary closure bolting, head closure studs, support skirts and attachment welds, pressurizer relief tank components, steam generator components, piping and components external surfaces and bolting	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Fatigue of metal components is addressed as a TLAA. Further evaluation is documented in Section 3.1.2.2.1.

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

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	Fatigue of metal components is addressed as a TLAA. Further evaluation is documented in Section 3.1.2.2.1.
3.1.1-09	Steel; stainless steel; steel with nickel-alloy or stainless steel cladding; nickel-alloy reactor vessel components: flanges; nozzles; penetrations; pressure housings; safe ends; thermal sleeves; vessel shells, heads and welds	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c) and environmental effects are to be addressed for Class 1 components	Yes, TLAA	Fatigue of metal components is addressed as a TLAA. 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	Fatigue of metal components is addressed as a TLAA. Further evaluation is documented in Section 3.1.2.2.1.
3.1.1-11	BWR Only				
3.1.1-12	Steel steam generator shell assembly exposed to secondary feedwater and steam	Loss of material due to general, pitting and crevice corrosion	Water Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated	This line item is not applicable to PINGP. This line is applicable to once through steam generators and not recirculating steam generators used at PINGP. Further evaluation is documented in Section 3.1.2.2.2.1.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-13	BWR Only				
3.1.1-14	BWR Only				
3.1.1-15	BWR Only				
3.1.1-16	Steel steam generator upper and lower shell and transition cone exposed to secondary feedwater and steam	Loss of material due to general, pitting and crevice corrosion	Inservice Inspection (IWB, IWC, and IWD), and Water Chemistry and, for Westinghouse Model 44 and 51 S/G, if general and pitting corrosion of the shell is known to exist, additional inspection procedures are to be developed.	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation.This aging effect is managed with the Water Chemistry Program and the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program. PINGP Unit 1 has Framatome Model 56/19 S/Gs and Unit 2 has Westinghouse Model 51, S/Gs. Unit 2 S/Gs have experienced corrosion, therefore additional inspections to detect general and pitting corrosion are performed on the shell to transition cone weld under ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item. Further evaluation is documented in Section 3.1.2.2.2.4.
3.1.1-17	Steel (with or without stainless steel cladding) reactor vessel beltline shell, nozzles, and welds	Loss of fracture toughness due to neutron irradiation embrittlement	TLAA, evaluated in accordance with Appendix G of 10 CFR Part 50 and RG 1.99. The applicant may choose to demonstrate that the materials of the nozzles are not controlling for the TLAA evaluations.	Yes, TLAA	Loss of fracture toughness due to neutron irradiation embrittlement is addressed as a TLAA. Further evaluation is documented in Section 3.1.2.2.3.1.

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

Item Number	Component	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	The plant-specific AMP that manages loss of fracture toughness due to neutron irradiation embrittlement of the steel (with or without stainless steel cladding) reactor vessel beltline shell, nozzles, and welds; safety injection nozzles is the Reactor Vessel Surveillance Program. Further evaluation is documented in Section 3.1.2.2.3.2.
3.1.1-19	BWR Only				
3.1.1-20	BWR Only				
3.1.1-21	Reactor vessel shell fabricated of SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Crack growth due to cyclic loading	TLAA	Yes, TLAA	Crack growth due to cyclic loading associated with underclad cracking is addressed as a TLAA. 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 (3) submit for NRC approval > 24 months before the extended period an RVI inspection plan based on industry recommendation.	No, but licensee commitment to be confirmed	Consistent with NUREG-1801. This aging effect is managed with the PWR Vessel Internals Program. Further evaluation is documented in Section 3.1.2.2.6.
3.1.1-23	Stainless steel reactor vessel closure head flange leak detection line and bottom-mounted instrument guide tubes	Cracking due to stress corrosion cracking	A plant-specific aging management program is to be evaluated.	Yes, plant specific	The plant-specific AMP that manages cracking due to stress corrosion cracking of the stainless steel reactor vessel closure head flange leak detection line and bottom-mounted instrument guide tubes is the Water Chemistry Program. Further evaluation is documented in Section 3.1.2.2.7.1.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-24	Class 1 cast austenitic stainless steel piping, piping components, and piping elements exposed to reactor coolant	Cracking due to stress corrosion cracking	Water Chemistry and, for CASS components that do not meet the NUREG-0313 guidelines, a plant specific aging management program	Yes, plant specific	The plant-specific AMP that manages cracking due to stress corrosion cracking of the Class 1 cast austenitic stainless steel piping, piping components, and piping elements exposed to reactor coolant in addition to the Water Chemistry Program is the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program. Further evaluation is documented in Section 3.1.2.2.7.2.
3.1.1-25	BWR Only				
3.1.1-26	BWR Only				
3.1.1-27	Stainless steel and nickel alloy reactor vessel internals screws, bolts, tie rods, and hold-down springs	Loss of preload due to stress relaxation	FSAR supplement commitment to (1) participate in industry RVI aging programs (2) implement applicable results (3) submit for NRC approval > 24 months before the extended period an RVI inspection plan based on industry recommendation.	No, but licensee commitment to be confirmed	Consistent with NUREG-1801. This aging effect is managed with the PWR Vessel Internals Program. 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	This line item is not applicable to PINGP. The PINGP steam generators do not have steam generator feedwater impingement plates and supports. Further evaluation is documented in Section 3.1.2.2.10.
3.1.1-29	BWR Only				

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-30	Stainless steel reactor vessel internals components (e.g., Upper internals assembly, RCCA guide tube assemblies, Baffle/former assembly, Lower internal assembly, shroud assemblies, Plenum cover and plenum cylinder, Upper grid assembly, Control rod guide tube (CRGT) assembly, Core support shield assembly, Core barrel assembly, Lower grid assembly, Flow distributor assembly, Thermal shield, Instrumentation support structures)	Cracking due to stress corrosion cracking, irradiation-assisted stress corrosion cracking	Water Chemistry and FSAR supplement commitment to (1) participate in industry RVI aging programs (2) implement applicable results (3) submit for NRC approval > 24 months before the extended period an RVI inspection plan based on industry recommendation.	No, but licensee commitment needs to be confirmed	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed by the Water Chemistry Program and the PWR Vessel Internals Program. Further evaluation is documented in Section 3.1.2.2.12.
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 exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program, the Water Chemistry Program, and the Nickel-Alloy Nozzles and Penetrations Program. Further evaluation is documented in Section 3.1.2.2.13.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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	This line item is not applicable to PINGP. The PINGP S/G feedwater inlet rings and supports do not perform a License Renewal intended function. Further evaluation is documented in Section 3.1.2.2.14.
3.1.1-33	Stainless steel and nickel alloy reactor vessel internals components	Changes in dimensions due to void swelling	FSAR supplement commitment to (1) participate in industry RVI aging programs (2) implement applicable results (3) submit for NRC approval > 24 months before the extended period an RVI inspection plan based on industry recommendation.	No, but licensee commitment to be confirmed	Consistent with NUREG-1801. This aging effect is managed by the PWR Vessel Internals Program. Further evaluation is documented in Section 3.1.2.2.15.
3.1.1-34	Stainless steel and nickel alloy reactor control rod drive head penetration pressure housings	Cracking due to stress corrosion cracking and primary water stress corrosion cracking	Inservice Inspection (IWB, IWC, and IWD) and Water Chemistry and for nickel alloy, FSAR supplement commitment to implement applicable plant commitments to (1) NRC Orders, Bulletins and Generic Letters associated with nickel alloys and (2) staff-accepted industry guidelines.	No, but licensee commitment needs to be confirmed	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed by a combination of the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program and the Water Chemistry Program. Further evaluation is documented in Section 3.1.2.2.16.1 PART I.

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

Item Number	Component	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	This line item is not applicable to PINGP. This line is applicable to once through steam generators and not recirculating steam generators used at PINGP. Further evaluation is documented in Section 3.1.2.2.16.1 PART II.
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 exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. Further evaluation is documented in Section 3.1.2.2.16.2.
3.1.1-37	Stainless steel and nickel alloy reactor vessel internals components (e.g., Upper internals assembly, RCCA guide tube assemblies, Lower internal assembly, CEA shroud assemblies, Core shroud assembly, Core support shield assembly, Core barrel assembly, Lower grid assembly, Flow distributor assembly)	Cracking due to stress corrosion cracking, primary water stress corrosion cracking, irradiation-assisted stress corrosion cracking	Water Chemistry and FSAR supplement commitment to (1) participate in industry RVI aging programs (2) implement applicable results (3) submit for NRC approval > 24 months before the extended period an RVI inspection plan based on industry recommendation.	No, but licensee commitment needs to be confirmed	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed by the Water Chemistry Program and the PWR Vessel Internals Program. Further evaluation is documented in Section 3.1.2.2.17.
3.1.1-38	BWR Only				
3.1.1-39	BWR Only				

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-40	BWR Only				
3.1.1-41	BWR Only				
3.1.1-42	BWR Only				
3.1.1-43	BWR Only				
3.1.1-44	BWR Only				
3.1.1-45	BWR Only				
3.1.1-46	BWR Only				
3.1.1-47	BWR Only				
3.1.1-48	BWR Only				
3.1.1-49	BWR Only				
3.1.1-50	BWR Only				
3.1.1-51	BWR Only				
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	Consistent with NUREG-1801 with exceptions. Exceptions apply to NUREG-1801 recommendations for the Bolting Integrity Program implementation. This aging effect is managed with the Bolting Integrity Program.
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	This line item is not applicable to PINGP. PINGP does not have steel piping, piping components, and piping elements exposed to closed cycle cooling water in NUREG -1801 Chapter IV systems.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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	This line item is not applicable to PINGP. PINGP does not have copper alloy piping, piping components, and piping elements exposed to closed cycle cooling water in NUREG -1801 Chapter IV systems.
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. Loss of fracture toughness due to thermal aging embrittlement is managed by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program.
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	This line item is not applicable to PINGP. PINGP does not have copper alloy >15% Zn piping, piping components, and piping elements exposed to closed-cycle cooling water in NUREG -1801 Chapter IV systems.
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. Loss of fracture toughness due to thermal aging embrittlement of CASS RC System piping is managed by the Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) 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. Loss of material due to Boric acid corrosion is managed by the Boric Acid Corrosion Program.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-59	Steel steam generator steam nozzle and safe end, feedwater nozzle and safe end, AFW nozzles and safe ends exposed to secondary feedwater/steam	Wall thinning due to flow-accelerated corrosion	Flow-Accelerated Corrosion	No	Consistent with NUREG-1801 with exceptions. Exceptions apply to NUREG-1801 recommendations for the Steam Generator Tube Integrity Program implementation. This aging effect is managed by the Flow-Accelerated Corrosion Program. The Unit 2 Feedwater Inlet Nozzle Thermal Sleeves are managed by the Steam Generator Tube Integrity Program.
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. This aging effect is managed by the Flux Thimble Tube Inspection 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. This aging effect is managed by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD 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 for PINGP. Cracking due to cyclic loading of stainless steel, steel with stainless steel cladding reactor coolant components exposed to reactor coolant is addressed in the evaluation of fatigue. See line item 3.1.1-08 for further discussion.

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

Item Number	Component	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. This aging effect is managed by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD 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 exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program and the Water Chemistry Program.
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 exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program, the Water Chemistry Program, and the Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-66	Steel steam generator secondary manways and handholds (cover only) exposed to air with leaking secondary side water and/or steam	Loss of material due to erosion	Inservice Inspection (IWB, IWC, and IWD) for Class 2 components	No	This line item is not applicable to PINGP. This line is applicable to once through steam generators and not recirculating steam generators used at PINGP. NUREG-1800 and NUREG-1801 state that this item is applicable to all PWRs. However, line item IV.D2-5 (R-31) applies to PWR once-through steam generators only. PINGP does not have once-through steam generators.
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	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program and the Water Chemistry Program.
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 exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program and the Water Chemistry Program.

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

Item Number	Component	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 exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program and the Water Chemistry Program.
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 exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. Aging effects is managed with a combination of the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program, the Water Chemistry Program and the One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program.
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. Aging effects are managed by the Reactor Head Closure Studs Program.
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 with exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program and the Steam Generator Tube Integrity Program implementation. These aging effects are managed by the Steam Generator Tube Integrity Program and the Water Chemistry Program.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-73	Nickel alloy steam generator tubes, repair sleeves, and tube plugs exposed to reactor coolant	Cracking due to primary water stress corrosion cracking	Steam Generator Tube Integrity and Water Chemistry	No	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program and the Steam Generator Tube Integrity Program implementation. This aging effect is managed by the Steam Generator Tube Integrity Program and the Water Chemistry Program.
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 exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program and the Steam Generator Tube Integrity Program implementation. Aging effects are managed by the Steam Generator Tube Integrity Program and the Water Chemistry Program. Additional exceptions apply to the Unit 1 Steam Flow Limiters which are consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. These aging effects are managed by the Water Chemistry Program and the One-Time Inspection Program.

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

Item Number	Component	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	This line item is not applicable to PINGP. This line is applicable to once through steam generators and not recirculating steam generators used at PINGP. NUREG-1800 and NUREG-1801 state that this item is applicable to all PWRs. However, line item IV.D2-13 (R-226) applies to PWR once-through steam generators only. PINGP does not have once-through steam generators. See line item 3.1.1-79 for further discussion.
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 exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program and the Steam Generator Tube Integrity Program implementation. Aging effects are managed by the Water Chemistry Program and the Steam Generator Tube Integrity Program.
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	This line item is not applicable to PINGP. PINGP does not use phosphate chemistry.
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	This line item is not applicable to PINGP. The PINGP S/Gs do not have lattice bars.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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 with exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program and the Steam Generator Tube Integrity Program implementation. Denting of the S/G U-Tubes is only applicable to Unit 2 at PINGP. Unit 1 U-tubes are held in place by stainless steel tube support plates with broached holes. This aging effect is managed by the Steam Generator Tube Integrity Program and the Water Chemistry Program. Analysis conducted in accordance with Bulletin 88-02 indicated that there is reasonable assurance that rapidly propagating fatigue cracks of the type that occurred at North Anna Unit 1 would not occur at PINGP Unit 2.
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. This aging effect is managed by the PWR Vessel Internals Program.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1-81	Nickel alloy or nickel-alloy clad steam generator divider plate exposed to reactor coolant	Cracking due to primary water stress corrosion cracking	Water Chemistry	No	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed by the Water Chemistry 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	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed by the Water Chemistry Program. The S/G primary side divider plates for both Units 1 and 2 are fabricated from nickel alloy.
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 exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed by the Water Chemistry 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	This line item is not applicable to PINGP. This line is applicable to once through steam generators and not recirculating steam generators used at PINGP. NUREG-1800 and NUREG-1801 state that this item is applicable to all PWRs. However, line item IV.D2-9 (R-36) applies to PWR once-through steam generators only. PINGP does not have once-through steam generators.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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.
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	Further evaluation in Section 3.5.2.2.1.4 concluded that steel components in concrete are not susceptible to aging and do not require aging management. Based on this same rational, steel and stainless steel piping, piping components, piping elements and miscellaneous structural components in concrete are not susceptible to aging and do not require aging management.

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners (Primary Closures)	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 104
Heater Sheaths	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None -	None	IV.E-2	3.1.1-86	C
			Treated Water (Int)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
					Water Chemistry Program	IV.C2-18	3.1.1-67	B
				Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-20	3.1.1-68	A
					Water Chemistry Program	IV.C2-20	3.1.1-68	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Heater Wells	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-2	3.1.1-86	C

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heater Wells	Pressure Boundary	Stainless Steel	Treated Water (Int)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
					Water Chemistry Program	IV.C2-18	3.1.1-67	B
				Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.3)	IV.C2-25	3.1.1-08	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Instrument Nozzles	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-2	3.1.1-86	A
			Treated Water (Int)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
					Water Chemistry Program	IV.C2-18	3.1.1-67	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Instrument Nozzles	Pressure Boundary	Stainless Steel	Treated Water (Int)	Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.3)	IV.C2-25	3.1.1-08	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Lower Head	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
					Water Chemistry Program	IV.C2-18	3.1.1-67	B
				Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-19	3.1.1-64	A
					Water Chemistry Program	IV.C2-19	3.1.1-64	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.3)	IV.C2-25	3.1.1-08	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Lower Head	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Manway Cover	Pressure Boundary	Carbon Steel with Stainless Steel Insert	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
				Cracking - Cyclic Loading	Water Chemistry Program	IV.C2-18	3.1.1-67	B
				Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.3)	IV.C2-25	3.1.1-08	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	D
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	D
Manway Flange	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manway Flange	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Treated Water (Int)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
					Water Chemistry Program	IV.C2-18	3.1.1-67	B
				Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.3)	IV.C2-25	3.1.1-08	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Relief Nozzle	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
					Water Chemistry Program	IV.C2-18	3.1.1-67	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Relief Nozzle	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Treated Water (Int)	Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.3)	IV.C2-25	3.1.1-08	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Relief Nozzle Safe End	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-2	3.1.1-86	A
			Treated Water (Int)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
					Water Chemistry Program	IV.C2-18	3.1.1-67	B
				Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Relief Nozzle Safe End	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Safety Nozzle Safe Ends	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-2	3.1.1-86	A
			Treated Water (Int)	Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Safety Nozzles	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
					Water Chemistry Program	IV.C2-18	3.1.1-67	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Safety Nozzles	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Treated Water (Int)	Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.3)	IV.C2-25	3.1.1-08	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Shell	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
					Water Chemistry Program	IV.C2-18	3.1.1-67	B
				Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-19	3.1.1-64	A
					Water Chemistry Program	IV.C2-19	3.1.1-64	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.3)	IV.C2-25	3.1.1-08	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Shell	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Spray Head	Spray	Cast Austenitic Stainless Steel	Treated Water (Ext)	Cracking - Stress Corrosion Cracking (SCC)	One-Time Inspection Program	IV.C2-17	3.1.1-36	A
					Water Chemistry Program	IV.C2-17	3.1.1-36	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Reduction of Fracture Toughness - Thermal Emb't	Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program	IV.C2-4	3.1.1-57	A
Spray Head Coupling	Pressure Boundary	Stainless Steel	Treated Water (Ext)	Cracking - Stress Corrosion Cracking (SCC)	One-Time Inspection Program	IV.C2-17	3.1.1-36	A
					Water Chemistry Program	IV.C2-17	3.1.1-36	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Spray Head Locking Bar	Structural Support	Stainless Steel	Treated Water (Ext)	Cracking - Stress Corrosion Cracking (SCC)	One-Time Inspection Program	IV.C2-17	3.1.1-36	A
					Water Chemistry Program	IV.C2-17	3.1.1-36	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Spray Nozzle	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
					Water Chemistry Program	IV.C2-18	3.1.1-67	B
				Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.3)	IV.C2-25	3.1.1-08	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Spray Nozzle Safe End	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-2	3.1.1-86	A
			Treated Water (Int)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
					Water Chemistry Program	IV.C2-18	3.1.1-67	B
				Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
				Cracking - Stress Corrosion Cracking (SCC)	Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.3)	IV.C2-25	3.1.1-08	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Spray Nozzle Thermal Sleeve	Pressure Boundary	Stainless Steel	Treated Water (Ext)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
					Water Chemistry Program	IV.C2-18	3.1.1-67	B
				Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Support Skirt and Flange	Structural Support	Carbon Steel	Primary Containment Air (Ext)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-16	3.1.1-61	A
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.3)	IV.A2-20	3.1.1-01	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Surge Nozzle	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
					Water Chemistry Program	IV.C2-18	3.1.1-67	B
				Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.3)	IV.C2-25	3.1.1-08	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
		Nickel Alloy	Primary Containment Air (Ext)	None	None	IV.E-1	3.1.1-85	A, 111
			Treated Water (Int)	Cracking - Primary Water Stress Corrosion Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-24	3.1.1-31	A, 111

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Surge Nozzle	Pressure Boundary	Nickel Alloy	Treated Water (Int)	Cracking - Primary Water Stress Corrosion Cracking	Nickel-Alloy Nozzles and Penetrations Program	IV.C2-24	3.1.1-31	A, 111
					Water Chemistry Program	IV.C2-24	3.1.1-31	B, 111
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.3)	IV.C2-25	3.1.1-08	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Surge Nozzle Safe End	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None -	None	IV.E-2	3.1.1-86	A
			Treated Water (Int)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
					Water Chemistry Program	IV.C2-18	3.1.1-67	B
				Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Surge Nozzle Thermal Sleeve	Pressure Boundary	Stainless Steel	Treated Water (Ext)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
					Water Chemistry Program	IV.C2-18	3.1.1-67	B
				Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Upper Head	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-18	3.1.1-67	A
					Water Chemistry Program	IV.C2-18	3.1.1-67	B
				Cracking - Stress Corrosion Cracking (SCC)	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-19	3.1.1-64	A
					Water Chemistry Program	IV.C2-19	3.1.1-64	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Upper Head	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Treated Water (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.3)	IV.C2-25	3.1.1-08	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
				Loss of Material - General Corrosion	Bolting Integrity Program	V.E-4	3.2.1-23	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 104
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
				Loss of Material - General Corrosion	Bolting Integrity Program	V.E-4	3.2.1-23	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 104
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 104
			Primary Containment Air (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 104
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A, 110
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A, 110
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
		Cast Iron	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A, 110
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A, 110

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Cast Iron	Lubricating Oil (Int)	Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 118
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A, 110
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A, 110
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
Heat Exchanger Tubes	Heat Transfer	Stainless Steel	Treated Water (Ext)	Heat Transfer Degradation - Fouling	Water Chemistry Program	V.A-16	3.2.1-10	E
			Treated Water (Int)	Heat Transfer Degradation - Fouling	Closed-Cycle Cooling Water System Program	VII.C2-3	3.3.1-52	B
	Pressure Boundary	Stainless Steel	Treated Water (Ext)	Cracking - SCC/IGA	Water Chemistry Program	V.D1-31	3.2.1-48	D
				Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	D
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	D
			Treated Water (Int)	Cracking - SCC/IGA	Closed-Cycle Cooling Water System Program	VII.C2-11	3.3.1-46	D
				Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	D
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	D

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Hydraulic Isolators	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	IV.E-3	3.1.1-86	A
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	V.D1-31	3.2.1-48	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Manifolds	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	IV.E-3	3.1.1-86	A
			Primary Containment Air (Ext)	None	None	IV.E-3	3.1.1-86	A
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	V.D1-31	3.2.1-48	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Piping / Fittings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A, 110
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A, 110

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
		Cast Austenitic Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-3	3.1.1-86	A
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-3	3.1.1-24	E
					Water Chemistry Program	IV.C2-3	3.1.1-24	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.6)			H
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Cast Austenitic Stainless Steel	Treated Water (Int)	Reduction of Fracture Toughness - Thermal Emb't	Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program	IV.C2-4	3.1.1-57	A
		Copper Alloy	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-19	3.4.1-18	A
					One-Time Inspection Program	VIII.G-19	3.4.1-18	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-19	3.4.1-18	A
					One-Time Inspection Program	VIII.G-19	3.4.1-18	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 118
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.E-11	3.2.1-45	A
		Stainless Steel	Nitrogen Gas (Int)	None	None	IV.E-5	3.1.1-86	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	IV.E-3	3.1.1-86	A
			Primary Containment Air (Ext)	None	None	IV.E-3	3.1.1-86	A
			Primary Containment Air (Int)	None	None	IV.E-2	3.1.1-86	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Steam (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A, 105
					Water Chemistry Program	IV.C2-2	3.1.1-68	B, 105
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.6)	IV.C2-25	3.1.1-08	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B, 105
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B, 105
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-1, IV.C2-2	3.1.1-70, 3.1.1-68	A
					One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program	IV.C2-1	3.1.1-70	A
					One-Time Inspection Program	VIII.E-30	3.4.1-14	A
					Water Chemistry Program	IV.C2-1, IV.C2-2, V.D1-31, VIII.E-30	3.1.1-70, 3.1.1-68, 3.2.1-48, 3.4.1-14	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.6)	IV.C2-25	3.1.1-08	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	IV.C2-15, V.D1-30, VIII.E-29	3.1.1-83, 3.2.1-49, 3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	IV.C2-15, V.D1-30, VIII.E-29	3.1.1-83, 3.2.1-49, 3.4.1-16	B
Pump Casings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A, 110
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A, 110
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
		Cast Austenitic Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-3	3.1.1-86	A
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-3	3.1.1-24	E
					Water Chemistry Program	IV.C2-3	3.1.1-24	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.5)			H
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Reduction of Fracture Toughness - Thermal Emb't	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-6	3.1.1-55	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Restricting Orifices	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-3	3.1.1-86	A
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
	Throttle	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-3	3.1.1-86	A
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Rupture Discs	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-3	3.1.1-86	A
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	V.D1-31	3.2.1-48	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Tanks	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.G-27	3.3.1-16	A
					One-Time Inspection Program	VII.G-27	3.3.1-16	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.G-27	3.3.1-16	A, 110
					One-Time Inspection Program	VII.G-27	3.3.1-16	A, 110
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.G-27	3.3.1-16	A
					One-Time Inspection Program	VII.G-27	3.3.1-16	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.G-27	3.3.1-16	A
					One-Time Inspection Program	VII.G-27	3.3.1-16	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A, 107
					Water Chemistry Program	VIII.E-40	3.4.1-06	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A, 107, 110
					Water Chemistry Program	VIII.E-40	3.4.1-06	B, 110
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A, 107
					Water Chemistry Program	VIII.E-40	3.4.1-06	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A, 107
					Water Chemistry Program	VIII.E-40	3.4.1-06	B
		Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-3	3.1.1-86	A
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	C
					Water Chemistry Program	IV.C2-2	3.1.1-68	D

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	D
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	D
Thermal Sleeves	Pressure Boundary	Stainless Steel	Treated Water (Ext)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Thermowells	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-3	3.1.1-86	A
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					Water Chemistry Program	IV.C2-2	3.1.1-68	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Bronze	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-19	3.4.1-18	A
					One-Time Inspection Program	VIII.G-19	3.4.1-18	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-19	3.4.1-18	A
					One-Time Inspection Program	VIII.G-19	3.4.1-18	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 118
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.E-11	3.2.1-45	A
		Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A, 110
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A, 110
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.C2-9	3.1.1-58	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
		Cast Austenitic Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-3	3.1.1-86	A
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-3	3.1.1-24	E
					Water Chemistry Program	IV.C2-3	3.1.1-24	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Reduction of Fracture Toughness - Thermal Emb't	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-6	3.1.1-55	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Nitrogen Gas (Int)	None	None	IV.E-5	3.1.1-86	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	IV.E-3	3.1.1-86	A
			Primary Containment Air (Ext)	None	None	IV.E-3	3.1.1-86	A
			Primary Containment Air (Int)	None	None	IV.E-2	3.1.1-86	A
			Steam (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A, 105
					Water Chemistry Program	IV.C2-2	3.1.1-68	B, 105
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B, 105
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B, 105
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					One-Time Inspection Program	VIII.E-30	3.4.1-14	A
					Water Chemistry Program	IV.C2-2, V.D1-31, VIII.E-30	3.1.1-68, 3.2.1-48, 3.4.1-14	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	IV.C2-15, V.D1-30, VIII.E-29	3.1.1-83, 3.2.1-49, 3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	IV.C2-15, V.D1-30, VIII.E-29	3.1.1-83, 3.2.1-49, 3.4.1-16	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Baffle and Former Plates	Pressure Boundary, Shielding, Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-1	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-2	3.1.1-30	A
					Water Chemistry Program	IV.B2-2	3.1.1-30	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-2	3.1.1-30	A
					Water Chemistry Program	IV.B2-2	3.1.1-30	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Reduction of Fracture Toughness - Void Swelling	PWR Vessel Internals Program	IV.B2-3	3.1.1-22	A
				Reduction of Fracture Toughness - Radiation Emb't	PWR Vessel Internals Program	IV.B2-3	3.1.1-22	A
Baffle and Former Plates Fasteners	Pressure Boundary, Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-4	3.1.1-33	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Baffle and Former Plates Fasteners	Pressure Boundary, Structural Support	Stainless Steel	Treated Water (Ext)	Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-10	3.1.1-30	A
					Water Chemistry Program	IV.B2-10	3.1.1-30	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-10	3.1.1-30	A
					Water Chemistry Program	IV.B2-10	3.1.1-30	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.2)	IV.B2-31	3.1.1-05	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Preload - Stress Relaxation	PWR Vessel Internals Program	IV.B2-5	3.1.1-27	A
				Reduction of Fracture Toughness - Void Swelling	PWR Vessel Internals Program	IV.B2-6	3.1.1-22	A
				Reduction of Fracture Toughness - Radiation Emb't	PWR Vessel Internals Program	IV.B2-6	3.1.1-22	A
BMI Column Cruciforms	Structural Support	Cast Austenitic Stainless Steel	Treated Water (Ext)	Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-12	3.1.1-30	A
					Water Chemistry Program	IV.B2-12	3.1.1-30	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
BMI Column Cruciforms	Structural Support	Cast Austenitic Stainless Steel	Treated Water (Ext)	Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-12	3.1.1-30	A
					Water Chemistry Program	IV.B2-12	3.1.1-30	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Reduction of Fracture Toughness - Radiation Emb't	PWR Vessel Internals Program	IV.B2-21	3.1.1-80	E
				Reduction of Fracture Toughness - Thermal Emb't	PWR Vessel Internals Program	IV.B2-21	3.1.1-80	E
BMI Columns and Flux Thimble Guides	Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-11	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-12	3.1.1-30	A
					Water Chemistry Program	IV.B2-12	3.1.1-30	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-12	3.1.1-30	A
					Water Chemistry Program	IV.B2-12	3.1.1-30	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Clevis insert Bolts	Structural Support	Nickel Alloy	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-15	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-16	3.1.1-37	A
					Water Chemistry Program	IV.B2-16	3.1.1-37	B
				Cracking - Primary Water Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-16	3.1.1-37	A
					Water Chemistry Program	IV.B2-16	3.1.1-37	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Preload - Stress Relaxation	PWR Vessel Internals Program	IV.B2-14	3.1.1-27	A
				Reduction of Fracture Toughness - Void Swelling	PWR Vessel Internals Program	IV.B2-17	3.1.1-22	A
				Reduction of Fracture Toughness - Radiation Emb't	PWR Vessel Internals Program	IV.B2-17	3.1.1-22	A
Core Barrel and Core Barrel Flange	Pressure Boundary, Shielding, Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-7	3.1.1-33	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Core Barrel and Core Barrel Flange	Pressure Boundary, Shielding, Structural Support	Stainless Steel	Treated Water (Ext)	Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-8	3.1.1-30	A
					Water Chemistry Program	IV.B2-8	3.1.1-30	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-8	3.1.1-30	A
					Water Chemistry Program	IV.B2-8	3.1.1-30	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Reduction of Fracture Toughness - Void Swelling	PWR Vessel Internals Program	IV.B2-9	3.1.1-22	A
				Reduction of Fracture Toughness - Radiation Emb't	PWR Vessel Internals Program	IV.B2-9	3.1.1-22	A
Core Barrel Outlet Nozzles	Pressure Boundary	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-7	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-8	3.1.1-30	A
					Water Chemistry Program	IV.B2-8	3.1.1-30	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-8	3.1.1-30	A
					Water Chemistry Program	IV.B2-8	3.1.1-30	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Core Barrel Outlet Nozzles	Pressure Boundary	Stainless Steel	Treated Water (Ext)	Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Reduction of Fracture Toughness - Void Swelling	PWR Vessel Internals Program	IV.B2-9	3.1.1-22	A
				Reduction of Fracture Toughness - Radiation Emb't	PWR Vessel Internals Program	IV.B2-9	3.1.1-22	A
Diffuser Plate	Pressure Boundary	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-23	3.1.1-33	C
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-24	3.1.1-30	C
					Water Chemistry Program	IV.B2-24	3.1.1-30	D
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-24	3.1.1-30	C
					Water Chemistry Program	IV.B2-24	3.1.1-30	D
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Diffuser Plate	Pressure Boundary	Stainless Steel	Treated Water (Ext)	Reduction of Fracture Toughness - Void Swelling	PWR Vessel Internals Program	IV.B2-22	3.1.1-22	C
				Reduction of Fracture Toughness - Radiation Emb't	PWR Vessel Internals Program	IV.B2-22	3.1.1-22	C
Flux Thimble Tubes	Pressure Boundary	Stainless Steel	Primary Containment Air (Int)	None	None	IV.E-3	3.1.1-86	A
			Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-11	3.1.1-33	C
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-12	3.1.1-30	C
					Water Chemistry Program	IV.B2-12	3.1.1-30	D
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-12	3.1.1-30	C
					Water Chemistry Program	IV.B2-12	3.1.1-30	D
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Wear	Flux Thimble Tube Inspection Program	IV.B2-13	3.1.1-60	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Head and Vessel Alignment Pins	Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-39	3.1.1-33	C
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-40	3.1.1-37	C
					Water Chemistry Program	IV.B2-40	3.1.1-37	D
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-40	3.1.1-37	C
					Water Chemistry Program	IV.B2-40	3.1.1-37	D
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
Head Cooling Spray Nozzles	Pressure Boundary	Stainless Steel	Treated Water (Int)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-23	3.1.1-33	C
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-24	3.1.1-30	C
					Water Chemistry Program	IV.B2-24	3.1.1-30	D
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-24	3.1.1-30	C
					Water Chemistry Program	IV.B2-24	3.1.1-30	D
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Head Cooling Spray Nozzles	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Reduction of Fracture Toughness - Void Swelling	PWR Vessel Internals Program	IV.B2-22	3.1.1-22	C
				Reduction of Fracture Toughness - Radiation Emb't	PWR Vessel Internals Program	IV.B2-22	3.1.1-22	C
Holddown Spring	Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-41	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-42	3.1.1-30	A
					Water Chemistry Program	IV.B2-42	3.1.1-30	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-42	3.1.1-30	A
					Water Chemistry Program	IV.B2-42	3.1.1-30	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Preload - Stress Relaxation	PWR Vessel Internals Program	IV.B2-33	3.1.1-27	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Lower Core Plate	Pressure Boundary, Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-19	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-20	3.1.1-37	A
					Water Chemistry Program	IV.B2-20	3.1.1-37	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-20	3.1.1-37	A
					Water Chemistry Program	IV.B2-20	3.1.1-37	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Reduction of Fracture Toughness - Void Swelling	PWR Vessel Internals Program	IV.B2-18	3.1.1-22	A
				Reduction of Fracture Toughness - Radiation Emb't	PWR Vessel Internals Program	IV.B2-18	3.1.1-22	A
Lower Core Plate Fuel Alignment Pins	Pressure Boundary, Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-15	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-16	3.1.1-37	A
					Water Chemistry Program	IV.B2-16	3.1.1-37	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Lower Core Plate Fuel Alignment Pins	Pressure Boundary, Structural Support	Stainless Steel	Treated Water (Ext)	Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-16	3.1.1-37	A
					Water Chemistry Program	IV.B2-16	3.1.1-37	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Reduction of Fracture Toughness - Void Swelling	PWR Vessel Internals Program	IV.B2-17	3.1.1-22	A
				Reduction of Fracture Toughness - Radiation Emb't	PWR Vessel Internals Program	IV.B2-17	3.1.1-22	A
Lower Support Column Bolts	Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-15	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-16	3.1.1-37	A
					Water Chemistry Program	IV.B2-16	3.1.1-37	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-16	3.1.1-37	A
					Water Chemistry Program	IV.B2-16	3.1.1-37	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Lower Support Column Bolts	Structural Support	Stainless Steel	Treated Water (Ext)	Loss of Preload - Stress Relaxation	PWR Vessel Internals Program	IV.B2-25	3.1.1-27	A
				Reduction of Fracture Toughness - Void Swelling	PWR Vessel Internals Program	IV.B2-17	3.1.1-22	A
				Reduction of Fracture Toughness - Radiation Emb't	PWR Vessel Internals Program	IV.B2-17	3.1.1-22	A
Lower Support Columns	Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-23	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-24	3.1.1-30	A
					Water Chemistry Program	IV.B2-24	3.1.1-30	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-24	3.1.1-30	A
					Water Chemistry Program	IV.B2-24	3.1.1-30	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Reduction of Fracture Toughness - Void Swelling	PWR Vessel Internals Program	IV.B2-22	3.1.1-22	A
				Reduction of Fracture Toughness - Radiation Emb't	PWR Vessel Internals Program	IV.B2-22	3.1.1-22	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Lower Support Forging	Pressure Boundary, Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-23	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-24	3.1.1-30	A
					Water Chemistry Program	IV.B2-24	3.1.1-30	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-24	3.1.1-30	A
					Water Chemistry Program	IV.B2-24	3.1.1-30	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Reduction of Fracture Toughness - Void Swelling	PWR Vessel Internals Program	IV.B2-22	3.1.1-22	A
				Reduction of Fracture Toughness - Radiation Emb't	PWR Vessel Internals Program	IV.B2-22	3.1.1-22	A
Radial Support Keys and Clevis inserts	Structural Support	Nickel Alloy	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-19	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-20	3.1.1-37	A
					Water Chemistry Program	IV.B2-20	3.1.1-37	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Radial Support Keys and Clevis inserts	Structural Support	Nickel Alloy	Treated Water (Ext)	Cracking - Primary Water Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-20	3.1.1-37	A
					Water Chemistry Program	IV.B2-20	3.1.1-37	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
Rod Cluster Control Assemblies Guide Tubes	Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-29	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-30	3.1.1-30	A
					Water Chemistry Program	IV.B2-30	3.1.1-30	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-30	3.1.1-30	A
					Water Chemistry Program	IV.B2-30	3.1.1-30	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.2)	IV.B2-31	3.1.1-05	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Rod Cluster Control Assemblies Guide Tube Fasteners	Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-27	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-28	3.1.1-37	A
					Water Chemistry Program	IV.B2-28	3.1.1-37	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-28	3.1.1-37	A
					Water Chemistry Program	IV.B2-28	3.1.1-37	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.2)	IV.B2-31	3.1.1-05	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
Rod Cluster Control Assemblies Guide Tube Pins	Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-27	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-28	3.1.1-37	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	Water Chemistry Program	IV.B2-28	3.1.1-37	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Rod Cluster Control Assemblies Guide Tube Pins	Structural Support	Stainless Steel	Treated Water (Ext)	Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-28	3.1.1-37	A
					Water Chemistry Program	IV.B2-28	3.1.1-37	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.2)	IV.B2-31	3.1.1-05	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
Secondary Core Support	Pressure Boundary, Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-23	3.1.1-33	C
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-24	3.1.1-30	C
					Water Chemistry Program	IV.B2-24	3.1.1-30	D
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-24	3.1.1-30	C
					Water Chemistry Program	IV.B2-24	3.1.1-30	D
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Secondary Core Support	Pressure Boundary, Structural Support	Stainless Steel	Treated Water (Ext)	Reduction of Fracture Toughness - Void Swelling	PWR Vessel Internals Program	IV.B2-22	3.1.1-22	C
				Reduction of Fracture Toughness - Radiation Emb't	PWR Vessel Internals Program	IV.B2-22	3.1.1-22	C
Thermal Shields	Shielding	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-7	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-8	3.1.1-30	A
					Water Chemistry Program	IV.B2-8	3.1.1-30	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-8	3.1.1-30	A
					Water Chemistry Program	IV.B2-8	3.1.1-30	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Reduction of Fracture Toughness - Void Swelling	PWR Vessel Internals Program	IV.B2-9	3.1.1-22	A
				Reduction of Fracture Toughness - Radiation Emb't	PWR Vessel Internals Program	IV.B2-9	3.1.1-22	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Upper Core Plate	Pressure Boundary, Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-41	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-42	3.1.1-30	A
					Water Chemistry Program	IV.B2-42	3.1.1-30	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-42	3.1.1-30	A
					Water Chemistry Program	IV.B2-42	3.1.1-30	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.2)	IV.B2-31	3.1.1-05	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
Upper Core Plate Alignment Keys	Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-39	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-40	3.1.1-37	A
					Water Chemistry Program	IV.B2-40	3.1.1-37	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-40	3.1.1-37	A
					Water Chemistry Program	IV.B2-40	3.1.1-37	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Upper Core Plate Alignment Keys	Structural Support	Stainless Steel	Treated Water (Ext)	Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Wear	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.B2-34	3.1.1-63	A
Upper Core Plate Fuel Alignment Pins	Pressure Boundary, Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-39	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-40	3.1.1-37	A
					Water Chemistry Program	IV.B2-40	3.1.1-37	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-40	3.1.1-37	A
					Water Chemistry Program	IV.B2-40	3.1.1-37	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.2)	IV.B2-31	3.1.1-05	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Upper Instrumentation Columns, Conduits, and Supports	Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-35	3.1.1-33	C
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-36	3.1.1-30	C
					Water Chemistry Program	IV.B2-36	3.1.1-30	D
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-36	3.1.1-30	C
					Water Chemistry Program	IV.B2-36	3.1.1-30	D
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
Upper Support Columns	Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-35	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-36	3.1.1-30	A
					Water Chemistry Program	IV.B2-36	3.1.1-30	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-36	3.1.1-30	A
					Water Chemistry Program	IV.B2-36	3.1.1-30	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.2)	IV.B2-31	3.1.1-05	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Upper Support Columns	Structural Support	Stainless Steel	Treated Water (Ext)	Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
Upper Support Column Fasteners	Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-39	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-40	3.1.1-37	A
					Water Chemistry Program	IV.B2-40	3.1.1-37	B
				Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-40	3.1.1-37	A
					Water Chemistry Program	IV.B2-40	3.1.1-37	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Preload - Stress Relaxation	PWR Vessel Internals Program	IV.B2-38	3.1.1-27	A
Upper Support Plate Assembly	Structural Support	Stainless Steel	Treated Water (Ext)	Changes in Dimensions - Void Swelling	PWR Vessel Internals Program	IV.B2-41	3.1.1-33	A
				Cracking - Irradiation-Assisted Stress Corrosion Cracking	PWR Vessel Internals Program	IV.B2-42	3.1.1-30	A
					Water Chemistry Program	IV.B2-42	3.1.1-30	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Upper Support Plate Assembly	Structural Support	Stainless Steel	Treated Water (Ext)	Cracking - Stress Corrosion Cracking (SCC)	PWR Vessel Internals Program	IV.B2-42	3.1.1-30	A
					Water Chemistry Program	IV.B2-42	3.1.1-30	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.2)	IV.B2-31	3.1.1-05	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.B2-32	3.1.1-83	B

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bottom Head Dome	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	TLAA (Section 4.7.2)	IV.A2-22	3.1.1-21	C
				Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-15	3.1.1-69	C, 112
					Water Chemistry Program	IV.A2-15	3.1.1-69	D, 112
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
Bottom Head Torus	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	TLAA (Section 4.7.2)	IV.A2-22	3.1.1-21	C
				Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-15	3.1.1-69	C, 112
					Water Chemistry Program	IV.A2-15	3.1.1-69	D, 112
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.1)	IV.A2-21	3.1.1-09	A

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bottom Head Torus	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
Bottom Mounted Instrumentation (BMI) Guide Tubes & Fittings	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-2	3.1.1-86	C
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	IV.A2-1	3.1.1-23	E
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	D
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	D
Closure Head Dome	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	TLAA (Section 4.7.2)	IV.A2-22	3.1.1-21	C
				Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-15	3.1.1-69	C, 112
					Water Chemistry Program	IV.A2-15	3.1.1-69	D, 112
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Closure Head Flange	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	TLAA (Section 4.7.2)	IV.A2-22	3.1.1-21	C
				Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-15	3.1.1-69	C, 112
					Water Chemistry Program	IV.A2-15	3.1.1-69	D, 112
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.1)	IV.A2-21	3.1.1-09	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
Closure Head Lifting Lugs	Structural Support	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A
Closure Head Studs, Nuts, & Washers	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Cracking - Stress Corrosion Cracking (SCC)	Reactor Head Closure Studs Program	IV.A2-2	3.1.1-71	A
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.1)	IV.A2-4	3.1.1-07	A

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Closure Head Studs, Nuts, & Washers	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A
				Loss of Material - Wear	Reactor Head Closure Studs Program	IV.A2-3	3.1.1-71	A
Core Support Pads	Structural Support	Nickel Alloy	Treated Water (Ext)	Cracking - Primary Water Stress Corrosion Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-12	3.1.1-31	A
					Nickel-Alloy Nozzles and Penetrations Program	IV.A2-12	3.1.1-31	A
					Water Chemistry Program	IV.A2-12	3.1.1-31	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.1)	IV.A2-21	3.1.1-09	C
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	D
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	D
CRDM Housing Tubes	Pressure Boundary	Nickel Alloy	Primary Containment Air (Ext)	None	None	IV.E-1	3.1.1-85	C
			Treated Water (Int)	Cracking - Primary Water Stress Corrosion Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-9	3.1.1-65	A

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
CRDM Housing Tubes	Pressure Boundary	Nickel Alloy	Treated Water (Int)	Cracking - Primary Water Stress Corrosion Cracking	Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program	IV.A2-9	3.1.1-65	A
					Water Chemistry Program	IV.A2-9	3.1.1-65	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.1)	IV.A2-21	3.1.1-09	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
CRDM Pressure Housings	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-2	3.1.1-86	C
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-11	3.1.1-34	A
					Water Chemistry Program	IV.A2-11	3.1.1-34	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.1)	IV.A2-21	3.1.1-09	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
CRDM Rod Travel Housings	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-2	3.1.1-86	C
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-11	3.1.1-34	A
					Water Chemistry Program	IV.A2-11	3.1.1-34	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.1)	IV.A2-21	3.1.1-09	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
External Support Brackets	Structural Support	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A
Flange O-Ring Leak Detection Tubes	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-2	3.1.1-86	C
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	IV.A2-5	3.1.1-23	E
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	D
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	D

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Incore Instr Seal Table and Fittings	Pressure Boundary, Structural Support	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-2	3.1.1-86	C
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-15	3.1.1-69	C, 112
					Water Chemistry Program	IV.A2-15	3.1.1-69	D, 112
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	D
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	D
Instrumentation Tube Penetrations (Bottom Head)	Pressure Boundary	Nickel Alloy	Primary Containment Air (Ext)	None	None	IV.E-1	3.1.1-85	C
			Treated Water (Int)	Cracking - Primary Water Stress Corrosion Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-19	3.1.1-31	A
					Nickel-Alloy Nozzles and Penetrations Program	IV.A2-19	3.1.1-31	A
					Water Chemistry Program	IV.A2-19	3.1.1-31	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.1)	IV.A2-21	3.1.1-09	A

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Instrumentation Tube Penetrations (Bottom Head)	Pressure Boundary	Nickel Alloy	Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
Instrumentation Tube Penetrations (Top Head)	Pressure Boundary	Nickel Alloy	Primary Containment Air (Ext)	None	None	IV.E-1	3.1.1-85	C
			Treated Water (Int)	Cracking - Primary Water Stress Corrosion Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-18	3.1.1-65	A
					Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program	IV.A2-18	3.1.1-65	A
				Cracking - Primary Water Stress Corrosion Cracking	Water Chemistry Program	IV.A2-18	3.1.1-65	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.1)	IV.A2-21	3.1.1-09	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Intermediate Shell Including Beltline Welds	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	TLAA (Section 4.7.2)	IV.A2-22	3.1.1-21	A
				Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-15	3.1.1-69	C, 112
					Water Chemistry Program	IV.A2-15	3.1.1-69	D, 112
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Reduction of Fracture Toughness - Radiation Emb't	Reactor Vessel Surveillance Program	IV.A2-24	3.1.1-18	A
					TLAA (Section 4.2)	IV.A2-23	3.1.1-17	A

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Lower Shell Including Beltline Welds	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	TLAA (Section 4.7.2)	IV.A2-22	3.1.1-21	A
				Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-15	3.1.1-69	C, 112
					Water Chemistry Program	IV.A2-15	3.1.1-69	D, 112
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Reduction of Fracture Toughness - Radiation Emb't	Reactor Vessel Surveillance Program	IV.A2-24	3.1.1-18	A
					TLAA (Section 4.2)	IV.A2-23	3.1.1-17	A
Nozzle Support Pads	Structural Support	Carbon Steel	Primary Containment Air (Ext)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.1)	IV.A2-20	3.1.1-01	C
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A
Primary Inlet Nozzles	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	TLAA (Section 4.7.2)	IV.A2-22	3.1.1-21	C

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Primary Inlet Nozzles	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-15	3.1.1-69	C, 112
					Water Chemistry Program	IV.A2-15	3.1.1-69	D, 112
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.1)	IV.A2-21	3.1.1-09	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Reduction of Fracture Toughness - Radiation Emb't	Reactor Vessel Surveillance Program	IV.A2-17	3.1.1-18	A
Primary Nozzle Safe Ends And Welds	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-2	3.1.1-86	C
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-15	3.1.1-69	A
					Water Chemistry Program	IV.A2-15	3.1.1-69	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Primary Outlet Nozzles	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	TLAA (Section 4.7.2)	IV.A2-22	3.1.1-21	C
				Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-15	3.1.1-69	C, 112
					Water Chemistry Program	IV.A2-15	3.1.1-69	D, 112
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.1)	IV.A2-21	3.1.1-09	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Reduction of Fracture Toughness - Radiation Emb't	Reactor Vessel Surveillance Program	IV.A2-17	3.1.1-18	A
RPV Refueling Seal Ledge	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
RVLIS Penetration Pipe Nozzle	Pressure Boundary	Nickel Alloy	Primary Containment Air (Ext)	None	None	IV.E-1	3.1.1-85	C
			Treated Water (Int)	Cracking - Primary Water Stress Corrosion Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-18	3.1.1-65	A
				Cracking - Primary Water Stress Corrosion Cracking	Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program	IV.A2-18	3.1.1-65	A
					Water Chemistry Program	IV.A2-18	3.1.1-65	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.1)	IV.A2-21	3.1.1-09	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Safety Injection Nozzles	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	TLAA (Section 4.7.2)	IV.A2-22	3.1.1-21	C
				Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-15	3.1.1-69	C, 112
					Water Chemistry Program	IV.A2-15	3.1.1-69	D, 112
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.1)	IV.A2-21	3.1.1-09	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Reduction of Fracture Toughness - Radiation Emb't	Reactor Vessel Surveillance Program	IV.A2-17	3.1.1-18	A

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Safety-Injection Nozzle Safe Ends and Welds	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-2	3.1.1-86	C
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-15	3.1.1-69	A
					Water Chemistry Program	IV.A2-15	3.1.1-69	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
Upper (Nozzle) Shell Including Beltline Welds	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	TLAA (Section 4.7.2)	IV.A2-22	3.1.1-21	A
				Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-15	3.1.1-69	C, 112
					Water Chemistry Program	IV.A2-15	3.1.1-69	D, 112

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Upper (Nozzle) Shell Including Beltline Welds	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Reduction of Fracture Toughness - Radiation Emb't	Reactor Vessel Surveillance Program	IV.A2-24	3.1.1-18	A
					TLAA (Section 4.2)	IV.A2-23	3.1.1-17	A
Vent Penetration Pipe Nozzle	Pressure Boundary	Nickel Alloy	Primary Containment Air (Ext)	None	None	IV.E-1	3.1.1-85	C
			Treated Water (Int)	Cracking - Primary Water Stress Corrosion Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-18	3.1.1-65	A
					Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program	IV.A2-18	3.1.1-65	A
					Water Chemistry Program	IV.A2-18	3.1.1-65	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.1)	IV.A2-21	3.1.1-09	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B

Table 3.1.2-4 Reactor Vessel, Internals, and Reactor Coolant System - Reactor Vessel System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Ventilation Shroud Support Ring	Structural Support	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A
Vessel Flange	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.A2-13	3.1.1-58	A
			Treated Water (Int)	Cracking - Cyclic Loading	TLAA (Section 4.7.2)	IV.A2-22	3.1.1-21	C
				Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-15	3.1.1-69	C, 112
					Water Chemistry Program	IV.A2-15	3.1.1-69	D, 112
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.1)	IV.A2-21	3.1.1-09	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.A2-14	3.1.1-83	B
				Loss of Material - Wear	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.A2-25	3.1.1-63	A

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Antivibration Bars (Unit 2)	Structural Support	Stainless Steel	Treated Water (Ext)	Cracking - SCC/IGA	Steam Generator Tube Integrity Program	IV.D1-14	3.1.1-74	B
					Water Chemistry Program	IV.D1-14	3.1.1-74	B
				Loss of Material - Crevice Corrosion	Steam Generator Tube Integrity Program	IV.D1-15	3.1.1-74	B
					Water Chemistry Program	IV.D1-15	3.1.1-74	B
				Loss of Material - Fretting	Steam Generator Tube Integrity Program	IV.D1-15	3.1.1-74	B
					Water Chemistry Program	IV.D1-15	3.1.1-74	B
				Loss of Material - Pitting Corrosion	Steam Generator Tube Integrity Program	IV.D1-15	3.1.1-74	B, 101
					Water Chemistry Program	IV.D1-15	3.1.1-74	B, 101
Antivibration Bars and Hardware (Unit 1)	Structural Support	Stainless Steel	Treated Water (Ext)	Cracking - SCC/IGA	Steam Generator Tube Integrity Program	IV.D1-14	3.1.1-74	B
					Water Chemistry Program	IV.D1-14	3.1.1-74	B
				Loss of Material - Crevice Corrosion	Steam Generator Tube Integrity Program	IV.D1-15	3.1.1-74	B
					Water Chemistry Program	IV.D1-15	3.1.1-74	B
				Loss of Material - Fretting	Steam Generator Tube Integrity Program	IV.D1-15	3.1.1-74	B
					Water Chemistry Program	IV.D1-15	3.1.1-74	B
				Loss of Material - Pitting Corrosion	Steam Generator Tube Integrity Program	IV.D1-15	3.1.1-74	B, 101
					Water Chemistry Program	IV.D1-15	3.1.1-74	B, 101

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Antivibration Bars Hardware (Unit 2)	Structural Support	Nickel Alloy	Treated Water (Ext)	Cracking - SCC/IGA	Steam Generator Tube Integrity Program	IV.D1-14	3.1.1-74	B
					Water Chemistry Program	IV.D1-14	3.1.1-74	B
				Loss of Material - Crevice Corrosion	Steam Generator Tube Integrity Program	IV.D1-15	3.1.1-74	B
					Water Chemistry Program	IV.D1-15	3.1.1-74	B
				Loss of Material - Fretting	Steam Generator Tube Integrity Program	IV.D1-15	3.1.1-74	B
					Water Chemistry Program	IV.D1-15	3.1.1-74	B
				Loss of Material - Pitting Corrosion	Steam Generator Tube Integrity Program	IV.D1-15	3.1.1-74	B, 101
					Water Chemistry Program	IV.D1-15	3.1.1-74	B, 101
Blowdown Piping Connections	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.D1-3	3.1.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C
					Water Chemistry Program	IV.D1-12	3.1.1-16	D
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	IV.D1-5	3.1.1-59	C

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Blowdown Piping Connections	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Galvanic Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C, 101, 110
					Water Chemistry Program	IV.D1-12	3.1.1-16	D, 101, 110
				Loss of Material - General Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C
					Water Chemistry Program	IV.D1-12	3.1.1-16	D
				Loss of Material - Pitting Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C
					Water Chemistry Program	IV.D1-12	3.1.1-16	D
Bolting / Fasteners (Primary Closures)	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.D1-3	3.1.1-58	A
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.D1-10	3.1.1-52	B, 104
Bolting / Fasteners (Secondary Closures)	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.4)	IV.C2-10	3.1.1-07	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.D1-3	3.1.1-58	A
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.D1-10	3.1.1-52	B, 104

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Channel Head and Cladding	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.D1-3	3.1.1-58	A
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-1	3.1.1-68	C
					Water Chemistry Program	IV.D1-1	3.1.1-68	D
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Divider Plate	Pressure Boundary	Nickel Alloy	Treated Water (Ext)	Cracking - Primary Water Stress Corrosion Cracking	Water Chemistry Program	IV.D1-6	3.1.1-81	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.4)	IV.D1-8	3.1.1-10	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Feedwater Inlet Nozzle	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.D1-3	3.1.1-58	A
			Treated Water (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.4)	IV.D1-11	3.1.1-07	A
				Loss of Material - Crevice Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C
					Water Chemistry Program	IV.D1-12	3.1.1-16	D
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	IV.D1-5	3.1.1-59	A
				Loss of Material - Galvanic Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C, 101, 110
					Water Chemistry Program	IV.D1-12	3.1.1-16	D, 101, 110
				Loss of Material - General Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C
					Water Chemistry Program	IV.D1-12	3.1.1-16	D
				Loss of Material - Pitting Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C
					Water Chemistry Program	IV.D1-12	3.1.1-16	D

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Feedwater Inlet Nozzle Thermal Sleeve (Unit 1)	Pressure Boundary	Stainless Steel	Treated Water (Ext)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.D1-5	3.4.1-14	A
					Water Chemistry Program	VIII.D1-5	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.D1-4	3.4.1-16	A
					Water Chemistry Program	VIII.D1-4	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.D1-4	3.4.1-16	A
					Water Chemistry Program	VIII.D1-4	3.4.1-16	B
Feedwater Inlet Nozzle Thermal Sleeve (Unit 2)	Pressure Boundary	Carbon Steel	Treated Water (Ext)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B
				Loss of Material - FAC	Steam Generator Tube Integrity Program	IV.D1-5	3.1.1-59	E
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A, 101, 110
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B, 101, 110
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Lower Shell	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.D1-3	3.1.1-58	A
			Treated Water (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.4)	IV.D1-11	3.1.1-07	A
				Loss of Material - Crevice Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	A, 114
					Water Chemistry Program	IV.D1-12	3.1.1-16	B, 114
				Loss of Material - Galvanic Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	A, 101, 110, 114
					Water Chemistry Program	IV.D1-12	3.1.1-16	B, 101, 110, 114
				Loss of Material - General Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	A, 114
					Water Chemistry Program	IV.D1-12	3.1.1-16	B, 114
				Loss of Material - Pitting Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	A, 114
					Water Chemistry Program	IV.D1-12	3.1.1-16	B, 114

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manway Covers with Inserts (Reactor Coolant Side)	Pressure Boundary	Carbon Steel with Stainless Steel Insert	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.D1-3	3.1.1-58	A
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-1	3.1.1-68	A
					Water Chemistry Program	IV.D1-1	3.1.1-68	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Nozzle Dam Rings for Attachments to Nozzle Dams	Structural Support	Stainless Steel	Treated Water (Ext)	Cracking - SCC/IGA	Water Chemistry Program	IV.D1-7	3.1.1-82	D
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Primary Inlet and Outlet Nozzles	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.D1-3	3.1.1-58	A
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-1	3.1.1-68	A
					Water Chemistry Program	IV.D1-1	3.1.1-68	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.4)	IV.D1-8	3.1.1-10	A

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Primary Inlet and Outlet Nozzles	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Primary Nozzle Safe Ends (Unit 1)	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	IV.E-2	3.1.1-86	A
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-1	3.1.1-68	A
					Water Chemistry Program	IV.D1-1	3.1.1-68	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Recirculation Nozzle (Unit 1)	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.D1-3	3.1.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C
					Water Chemistry Program	IV.D1-12	3.1.1-16	D
				Loss of Material - Galvanic Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C, 101, 110
					Water Chemistry Program	IV.D1-12	3.1.1-16	D, 101, 110

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Recirculation Nozzle (Unit 1)	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - General Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C
					Water Chemistry Program	IV.D1-12	3.1.1-16	D
				Loss of Material - Pitting Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C
					Water Chemistry Program	IV.D1-12	3.1.1-16	D
Secondary Closures (Unit 2)	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.D1-3	3.1.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C
					Water Chemistry Program	IV.D1-12	3.1.1-16	D
				Loss of Material - Galvanic Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C, 101, 110
					Water Chemistry Program	IV.D1-12	3.1.1-16	D, 101, 110
				Loss of Material - General Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C
					Water Chemistry Program	IV.D1-12	3.1.1-16	D

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Secondary Closures (Unit 2)	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Pitting Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C
					Water Chemistry Program	IV.D1-12	3.1.1-16	D
Secondary Closures with Insert (Unit 1)	Pressure Boundary	Carbon Steel with Stainless Steel Insert	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.D1-3	3.1.1-58	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.F-24	3.4.1-14	A
					Water Chemistry Program	VIII.F-24	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-23	3.4.1-16	A
					Water Chemistry Program	VIII.F-23	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-23	3.4.1-16	A
					Water Chemistry Program	VIII.F-23	3.4.1-16	B
Steam Flow Limiter (Unit 1)	Throttle	Nickel Alloy	Steam (Ext)	Cracking - SCC/IGA	One-Time Inspection Program	IV.D1-14	3.1.1-74	E
					Water Chemistry Program	IV.D1-14	3.1.1-74	D
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	IV.D1-15	3.1.1-74	E
					Water Chemistry Program	IV.D1-15	3.1.1-74	D
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	IV.D1-15	3.1.1-74	E, 101
					Water Chemistry Program	IV.D1-15	3.1.1-74	D, 101

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steam Generator Shell Penetrations (Indication and Sample)	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.D1-3	3.1.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C
					Water Chemistry Program	IV.D1-12	3.1.1-16	D
				Loss of Material - Galvanic Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C, 101, 110
					Water Chemistry Program	IV.D1-12	3.1.1-16	D, 101, 110
				Loss of Material - General Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C
					Water Chemistry Program	IV.D1-12	3.1.1-16	D
				Loss of Material - Pitting Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	C
					Water Chemistry Program	IV.D1-12	3.1.1-16	D
Steam Outlet Nozzle	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.D1-3	3.1.1-58	A
			Steam (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.4)	IV.D1-11	3.1.1-07	A

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steam Outlet Nozzle	Pressure Boundary	Carbon Steel	Steam (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.B1-8	3.4.1-37	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	IV.D1-5	3.1.1-59	A
				Loss of Material - Galvanic Corrosion	Water Chemistry Program	VIII.B1-8	3.4.1-37	B, 101, 110
				Loss of Material - General Corrosion	Water Chemistry Program	VIII.B1-8	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.B1-8	3.4.1-37	B
Transition Cone	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.D1-3	3.1.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	A, 114
					Water Chemistry Program	IV.D1-12	3.1.1-16	B, 114
				Loss of Material - Galvanic Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	A, 101, 110, 114
					Water Chemistry Program	IV.D1-12	3.1.1-16	B, 101, 110, 114
				Loss of Material - General Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	A, 114
					Water Chemistry Program	IV.D1-12	3.1.1-16	B, 114

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Transition Cone	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Pitting Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	A, 114
					Water Chemistry Program	IV.D1-12	3.1.1-16	B, 114
Tube Bundle Wrapper and Wrapper Support System	Pressure Boundary, Structural Support	Carbon Steel	Treated Water (Ext)	Loss of Material - Crevice Corrosion	Steam Generator Tube Integrity Program	IV.D1-9	3.1.1-76	B
					Water Chemistry Program	IV.D1-9	3.1.1-76	B
				Loss of Material - Erosion	Steam Generator Tube Integrity Program	IV.D1-9	3.1.1-76	B
					Water Chemistry Program	IV.D1-9	3.1.1-76	B
				Loss of Material - Galvanic Corrosion	Steam Generator Tube Integrity Program	IV.D1-9	3.1.1-76	B, 101, 110
					Water Chemistry Program	IV.D1-9	3.1.1-76	B, 101, 110
				Loss of Material - General Corrosion	Steam Generator Tube Integrity Program	IV.D1-9	3.1.1-76	B
					Water Chemistry Program	IV.D1-9	3.1.1-76	B
				Loss of Material - Pitting Corrosion	Steam Generator Tube Integrity Program	IV.D1-9	3.1.1-76	B
					Water Chemistry Program	IV.D1-9	3.1.1-76	B
Tube Plugs	Pressure Boundary	Nickel Alloy	Treated Water (Ext)	Cracking - Primary Water Stress Corrosion Cracking	Steam Generator Tube Integrity Program	IV.D1-18	3.1.1-73	B
					Water Chemistry Program	IV.D1-18	3.1.1-73	B

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tube Plugs	Pressure Boundary	Nickel Alloy	Treated Water (Ext)	Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Tube Support Plates (Unit 1)	Structural Support	Stainless Steel	Treated Water (Ext)	Cracking - SCC/IGA	Steam Generator Tube Integrity Program	IV.D1-14	3.1.1-74	D
					Water Chemistry Program	IV.D1-14	3.1.1-74	D
				Loss of Material - Crevice Corrosion	Steam Generator Tube Integrity Program	IV.D1-15	3.1.1-74	D
					Water Chemistry Program	IV.D1-15	3.1.1-74	D
				Loss of Material - Pitting Corrosion	Steam Generator Tube Integrity Program	IV.D1-15	3.1.1-74	D, 101
					Water Chemistry Program	IV.D1-15	3.1.1-74	D, 101
Tube Support Plates (Unit 2)	Structural Support	Carbon Steel	Treated Water (Ext)	Ligament Cracking - Corrosion	Steam Generator Tube Integrity Program	IV.D1-17	3.1.1-76	B
					Water Chemistry Program	IV.D1-17	3.1.1-76	B
				Loss of Material - Crevice Corrosion	Steam Generator Tube Integrity Program	IV.D1-9	3.1.1-76	D
					Water Chemistry Program	IV.D1-9	3.1.1-76	D
				Loss of Material - Galvanic Corrosion	Steam Generator Tube Integrity Program	IV.D1-9	3.1.1-76	D, 101, 110
					Water Chemistry Program	IV.D1-9	3.1.1-76	D, 101, 110

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tube Support Plates (Unit 2)	Structural Support	Carbon Steel	Treated Water (Ext)	Loss of Material - General Corrosion	Steam Generator Tube Integrity Program	IV.D1-9	3.1.1-76	D
					Water Chemistry Program	IV.D1-9	3.1.1-76	D
				Loss of Material - Pitting Corrosion	Steam Generator Tube Integrity Program	IV.D1-9	3.1.1-76	D
					Water Chemistry Program	IV.D1-9	3.1.1-76	D
Tubesheet with Cladding	Pressure Boundary	Carbon Steel w/ Nickel-alloy Clad	Treated Water (Ext)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.4)	IV.D1-11	3.1.1-07	C
				Loss of Material - Crevice Corrosion	Steam Generator Tube Integrity Program	IV.D1-9	3.1.1-76	D
					Water Chemistry Program	IV.D1-9	3.1.1-76	D
				Loss of Material - Galvanic Corrosion	Steam Generator Tube Integrity Program	IV.D1-9	3.1.1-76	D, 101, 110
					Water Chemistry Program	IV.D1-9	3.1.1-76	D, 101, 110
				Loss of Material - General Corrosion	Steam Generator Tube Integrity Program	IV.D1-9	3.1.1-76	D
					Water Chemistry Program	IV.D1-9	3.1.1-76	D
				Loss of Material - Pitting Corrosion	Steam Generator Tube Integrity Program	IV.D1-9	3.1.1-76	D
					Water Chemistry Program	IV.D1-9	3.1.1-76	D
			Treated Water (Int)	Cracking - Primary Water Stress Corrosion Cracking	Water Chemistry Program	IV.D1-6	3.1.1-81	D

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tubesheet with Cladding	Pressure Boundary	Carbon Steel w/ Nickel-alloy Clad	Treated Water (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.4)	IV.D1-8	3.1.1-10	C
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
Upper Shell	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	IV.D1-3	3.1.1-58	A
			Steam (Int)	Loss of Material - Crevice Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	A, 114
					Water Chemistry Program	IV.D1-12	3.1.1-16	B, 114
				Loss of Material - Galvanic Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	A, 101, 110, 114
				Loss of Material - Galvanic Corrosion	Water Chemistry Program	IV.D1-12	3.1.1-16	B, 101, 110, 114
				Loss of Material - General Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	A, 114
					Water Chemistry Program	IV.D1-12	3.1.1-16	B, 114
				Loss of Material - Pitting Corrosion	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.D1-12	3.1.1-16	A, 114
					Water Chemistry Program	IV.D1-12	3.1.1-16	B, 114

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
U-Tubes (Unit 1)	Heat Transfer	Nickel Alloy	Treated Water (Ext)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.4)	IV.D1-21	3.1.1-06	A
				Heat Transfer Degradation - Fouling	Water Chemistry Program			H
			Treated Water (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.4)	IV.D1-21	3.1.1-06	A
				Heat Transfer Degradation - Fouling	Water Chemistry Program			H
	Pressure Boundary	Nickel Alloy	Treated Water (Ext)	Cracking - Intergranular Attack	Steam Generator Tube Integrity Program	IV.D1-22	3.1.1-72	B
					Water Chemistry Program	IV.D1-22	3.1.1-72	B
				Cracking - Outer Diameter Stress Corrosion Cracking	Steam Generator Tube Integrity Program	IV.D1-23	3.1.1-72	B
					Water Chemistry Program	IV.D1-23	3.1.1-72	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.4)	IV.D1-21	3.1.1-06	A
				Loss of Material - Crevice Corrosion	Steam Generator Tube Integrity Program	IV.D1-15	3.1.1-74	D
					Water Chemistry Program	IV.D1-15	3.1.1-74	D
				Loss of Material - Fretting	Steam Generator Tube Integrity Program	IV.D1-24	3.1.1-72	B
					Water Chemistry Program	IV.D1-24	3.1.1-72	B

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
U-Tubes (Unit 1)	Pressure Boundary	Nickel Alloy	Treated Water (Ext)	Loss of Material - Pitting Corrosion	Steam Generator Tube Integrity Program	IV.D1-15	3.1.1-74	D, 101
					Water Chemistry Program	IV.D1-15	3.1.1-74	D, 101
				Loss of Material - Wear	Steam Generator Tube Integrity Program	IV.D1-24	3.1.1-72	B
					Water Chemistry Program	IV.D1-24	3.1.1-72	B
			Treated Water (Int)	Cracking - Primary Water Stress Corrosion Cracking	Steam Generator Tube Integrity Program	IV.D1-20	3.1.1-73	B
					Water Chemistry Program	IV.D1-20	3.1.1-73	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.4)	IV.D1-21	3.1.1-06	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
U-Tubes (Unit 2)	Heat Transfer	Nickel Alloy	Treated Water (Ext)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.4)	IV.D1-21	3.1.1-06	A
				Heat Transfer Degradation - Fouling	Water Chemistry Program			H
			Treated Water (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.4)	IV.D1-21	3.1.1-06	A
				Heat Transfer Degradation - Fouling	Water Chemistry Program			H

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
U-Tubes (Unit 2)	Pressure Boundary	Nickel Alloy	Treated Water (Ext)	Cracking - Intergranular Attack	Steam Generator Tube Integrity Program	IV.D1-22	3.1.1-72	B
					Water Chemistry Program	IV.D1-22	3.1.1-72	B
				Cracking - Outer Diameter Stress Corrosion Cracking	Steam Generator Tube Integrity Program	IV.D1-23	3.1.1-72	B
					Water Chemistry Program	IV.D1-23	3.1.1-72	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.4)	IV.D1-21	3.1.1-06	A
				Denting - Corrosion of Carbon Steel Tube Support Plate	Steam Generator Tube Integrity Program	IV.D1-19	3.1.1-79	B, 115
					Water Chemistry Program	IV.D1-19	3.1.1-79	B, 115
				Loss of Material - Crevice Corrosion	Steam Generator Tube Integrity Program	IV.D1-15	3.1.1-74	D
					Water Chemistry Program	IV.D1-15	3.1.1-74	D
				Loss of Material - Fretting	Steam Generator Tube Integrity Program	IV.D1-24	3.1.1-72	B
					Water Chemistry Program	IV.D1-24	3.1.1-72	B
				Loss of Material - Pitting Corrosion	Steam Generator Tube Integrity Program	IV.D1-15	3.1.1-74	D, 101
					Water Chemistry Program	IV.D1-15	3.1.1-74	D, 101
				Loss of Material - Wear	Steam Generator Tube Integrity Program	IV.D1-24	3.1.1-72	B
					Water Chemistry Program	IV.D1-24	3.1.1-72	B

Table 3.1.2-5 Reactor Vessel, Internals, and Reactor Coolant System - Steam Generator System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
U-Tubes (Unit 2)	Pressure Boundary	Nickel Alloy	Treated Water (Int)	Cracking - Primary Water Stress Corrosion Cracking	Steam Generator Tube Integrity Program	IV.D1-20	3.1.1-73	B
					Water Chemistry Program	IV.D1-20	3.1.1-73	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.1.4)	IV.D1-21	3.1.1-06	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	IV.C2-15	3.1.1-83	B

Notes for Tables 3.1.2-1 through 3.1.2-5

A Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

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

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

D Component is different, but consistent with NUREG-1801 for material, environment, and aging effect. AMP takes 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 for this component.

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

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

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

J Neither the component nor the material and environment combination are evaluated in NUREG-1801.

Plant-specific notes:

101 Aging mechanism(s) is not in NUREG-1801 for this component, material, and environment combination.

102 Intentionally left blank.

103 Intentionally left blank.

104 There are no bolts with a specified minimum yield strength >150 ksi in this system. Therefore, SCC is not an applicable aging effect/mechanism.

105 A Steam environment is evaluated the same as a Treated Water environment.

106 Components that are buried in the ground are analyzed in the same manner as raw water (damp soil containing groundwater).

107 No credit is taken for protective coatings (paint, galvanized pipe, linings, etc.) for components in the PINGP mechanical aging management evaluations.

108 In some cases where the Plant Chemistry Program is not a viable option and aging effects/ mechanisms are not expected to be significant; the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program alone is credited for managing these aging effects. The AMP referenced is appropriate for the aging effect(s)/ mechanism(s) identified and provides assurance that the aging effect(s)/mechanism(s) are effectively managed through the period of extended operation.

109 Intentionally left blank.

110 Loss of material due to galvanic corrosion is evaluated in a raw water, treated water, fuel oil, lubricating oil, and wet air/gas (if applicable) environment.

111 The Unit 2 Pressurizer surge nozzle to safe end weld is Alloy 82. Examinations of the weld are conducted by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program.

112 The aging effect/mechanism, cracking due to stress corrosion cracking, was assigned to this component based on industry Operating Experience.

113 Materials science evaluation for this material in this environment results in no aging effects.

114 Unit 2 steam generators are Westinghouse Model 51 Steam Generators and have experienced corrosion. Therefore, additional inspections to detect general and pitting corrosion are performed on the shell to transition cone weld under the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program.

115 Denting of the steam generator U-tubes is only applicable to Unit 2. Unit 1 U-tubes are held in place by stainless steel tube support plates with broached holes.

116 Loss of material due to MIC is evaluated for stainless steel in a raw water environment.

117 Dry/Filtered Instrument Air is evaluated the same as gas.

118 Loss of material due to selective leaching for copper alloys and gray cast iron is evaluated in a fuel oil and lubricating oil environment.

119 The environment for this line item is equivalent to Plant Indoor Air - Uncontrolled with the potential for moisture or condensation.

120 The environment for this component is evaluated as Raw Water and is essentially waste water or a potential mixture of water and oil.

121 This line item includes both heat exchanger components and non-regenerative heat exchanger components.

122 Chrome-molybdenum alloy components are evaluated the same as steel (carbon steel, low-alloy steel and cast iron) components.

123 The External Surfaces Monitoring Program is credited with managing aging effects of internal surfaces where the external surfaces are subject to the same environment or stressor as the internal surfaces such that that external condition is representative of the internal surface condition.

3.2 Aging Management of Engineered Safety Features

3.2.1 Introduction

This section provides the results of the AMR for those components identified in Section 2.3.2, Engineered Safety Features, as being subject to an AMR. The systems, or portions of systems, which are addressed in this section, are described in the indicated sections.

- Containment Spray System (Section 2.3.2.1)
- Residual Heat Removal System (Section 2.3.2.2)
- Safety Injection System (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 for the Engineered Safety Features components that are utilized in License Renewal. This table uses the format described in Section 3.0. Note that this table only includes those components that are applicable to a PWR.

3.2.2 Results

The following tables summarize the results of the AMR for systems in the Engineered Safety Features group.

Table 3.2.2-1, Engineered Safety Features - Containment Spray System - Summary of Aging Management Evaluation

Table 3.2.2-2, Engineered Safety Features - Residual Heat Removal System - Summary of Aging Management Evaluation

Table 3.2.2-3, Engineered Safety Features - Safety Injection System - Summary of Aging Management Evaluation

The materials that specific components are fabricated from, the environments to which components are exposed, the potential aging effects requiring management, and the AMPs used to manage these aging effects are provided for each of the above systems in the following subsections of Section 3.2.2.1, Materials, Environment, Aging Effects Requiring Management and Aging Management Programs:

Section 3.2.2.1.1, Containment Spray System

Section 3.2.2.1.2, Residual Heat Removal System

Section 3.2.2.1.3, Safety Injection System

3.2.2.1 Materials, Environment, Aging Effects Requiring Management and Aging Management Programs

3.2.2.1.1 Containment Spray System

Materials

The materials of construction for the CS System are:

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

Environment

The CS System components are exposed to the following environments:

- Plant Indoor Air - Uncontrolled (External)
- Primary Containment Air (External)
- Primary Containment Air (Internal)
- Treated Water (External)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the CS System, require management:

- Heat Transfer Degradation - Fouling
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the CS System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- Closed-Cycle Cooling Water System Program
- External Surfaces Monitoring Program
- One-Time Inspection Program
- Selective Leaching of Materials Program
- Water Chemistry Program

3.2.2.1.2 Residual Heat Removal System

Materials

The materials of construction for the RH System are:

- Carbon Steel
- Carbon Steel with Stainless Steel Clad
- Cast Austenitic Stainless Steel
- Cast Iron
- Stainless Steel

Environment

The RH System components are exposed to the following environments:

- Plant Indoor Air - Uncontrolled (External)
- Plant Indoor Air - Uncontrolled (Internal)
- Primary Containment Air (External)
- Primary Containment Air (Internal)
- Treated Water (External)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the RH System, require management:

- Cracking - SCC/IGA

- Heat Transfer Degradation - Fouling
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening
- Reduction of Fracture Toughness - Thermal Embrittlement

Aging Management Programs

The following AMPs manage the aging effects for the RH System components:

- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program
- Bolting Integrity Program
- Boric Acid Corrosion Program
- Closed-Cycle Cooling Water System Program
- External Surfaces Monitoring Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program
- One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program
- Selective Leaching of Materials Program
- Water Chemistry Program

3.2.2.1.3 **Safety Injection System**

Materials

The materials of construction for the SI System are:

- Brass
- Carbon Steel
- Carbon Steel with Stainless Steel Clad
- Cast Austenitic Stainless Steel
- Cast Iron

- Copper Alloy
- PVC
- Stainless Steel

Environment

The SI System components are exposed to the following environments:

- Lubricating Oil (Internal)
- Nitrogen Gas (Internal)
- Plant Indoor Air - Uncontrolled (External)
- Primary Containment Air (External)
- Treated Water (External)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the SI System, require management:

- Change in Material Properties - Ozone Exposure
- Change in Material Properties - Ultraviolet Exposure
- Cracking - Ozone Exposure
- Cracking - SCC/IGA
- Cracking - Ultraviolet Exposure
- Heat Transfer Degradation - Fouling
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening
- Reduction of Fracture Toughness - Thermal Embrittlement

Aging Management Programs

The following AMPs manage the aging effects for the SI System components:

- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program
- Bolting Integrity Program
- Boric Acid Corrosion Program
- Closed-Cycle Cooling Water System Program
- External Surfaces Monitoring Program
- Lubricating Oil Analysis Program
- One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program
- One-Time Inspection Program
- Selective Leaching of Materials Program
- Water Chemistry Program

3.2.2.2 Further Evaluation of Aging Management as Recommended by NUREG-1801

NUREG-1801 Volume 1 Tables provide the basis for identifying those programs that warrant further evaluation by the reviewer in the LRA. For the Engineered Safety Features, those programs are addressed in the following sections.

3.2.2.2.1 Cumulative Fatigue Damage

Fatigue of metal components in Engineered Safety Features systems is a TLAA as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). These TLAAs are addressed in Section 4.3 of the LRA.

3.2.2.2.2 Loss of Material due to Cladding Breach

This line item is not applicable at PINGP. PINGP does not have steel with stainless steel cladding pump casings exposed to treated borated water. The charging pumps at PINGP are fabricated from stainless steel.

3.2.2.2.3 Loss of Material due to Pitting and Crevice Corrosion

1. Loss of material due to pitting and crevice corrosion could occur in stainless steel containment isolation piping and components internal surfaces exposed to treated water. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time

Inspection Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation.

2. Loss of material due to pitting and crevice corrosion could occur for stainless steel piping, piping components, and piping elements exposed to soil. PINGP does not have stainless steel piping, piping components, and piping elements exposed to soil in NUREG-1801 Chapter V systems.

3. BWR Only

4. Loss of material due to pitting and crevice corrosion could occur in stainless steel and copper alloy piping, piping components, and piping elements exposed to lubricating oil. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. The Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results. The program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation.

5. Loss of material due to pitting and crevice corrosion could occur for partially encased stainless steel tanks with breached moisture barrier exposed to raw water. PINGP does not have stainless steel tanks with breached moisture barrier exposed to raw water in NUREG-1801 Chapter V systems.

6. Loss of material due to pitting and crevice corrosion could occur for stainless steel piping, piping components, piping elements, and tank

internal surfaces exposed to condensation (internal). PINGP does not have stainless steel piping and piping components exposed to condensation in NUREG-1801 Chapter V systems.

3.2.2.2.4 Reduction of Heat Transfer due to Fouling

1. Reduction of heat transfer due to fouling could occur in steel, stainless steel, and copper alloy heat exchanger tubes exposed to lubricating oil. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. The Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results. The program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation.
2. Reduction of heat transfer due to fouling could occur in stainless steel heat exchanger tubes exposed to borated treated water. This aging effect is managed with the Water Chemistry Program. The One Time Inspection Program is not required to verify the water chemistry effectiveness for a borated treated water environment as demonstrated in NUREG-1801, line items 3.2.1-48 and 3.2.1-49. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. This program assures 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

BWR Only

3.2.2.2.6 Loss of Material due to Erosion

This line item is not applicable at PINGP. The PINGP safety injection pumps are not used for normal charging.

3.2.2.2.7 **Loss of Material due to General Corrosion and Fouling**

BWR Only

3.2.2.2.8 **Loss of material due to General, Pitting, and Crevice Corrosion**

1. BWR Only
2. Loss of material due to general, pitting, and crevice corrosion could occur in steel containment isolation piping, piping components, and piping elements internal surfaces exposed to treated water. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation.
3. Loss of material due to general, pitting, and crevice corrosion could occur in steel piping, piping components, and piping elements exposed to lubricating oil. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. The Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results. The program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation.

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 microbiologically-influenced corrosion could occur for steel (with or without coating or wrapping) piping, piping components, and piping elements buried in soil. PINGP does not have any steel (with or without coating or wrapping) piping, piping components, or piping elements buried in soil in NUREG-1801 Chapter V systems.

3.2.2.3 Time-Limited Aging Analyses

The TLAAs identified below are associated with the Engineered Safety Features system components. The section of the LRA that contains the TLAA review results is indicated in parenthesis.

- Metal Fatigue (Section 4.3)

3.2.3 Conclusion

The Engineered Safety Features piping, fittings, and components that are subject to an AMR have been identified in accordance with the requirements of 10 CFR 54.4. The AMPs selected to manage aging effects for the Engineered Safety Features components are identified in the summary tables and Section 3.2.2.1.

A description of these AMPs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation.

Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the Engineered Safety Features components will be adequately managed so that there is reasonable assurance that the intended function(s) 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

Item Number	Component	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	Fatigue of metal components in Engineered Safety Features systems is addressed as a TLAA. 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 due to cladding breach	A plant-specific aging management program is to be evaluated. Reference NRC Information Notice 94-63, Boric Acid Corrosion of Charging Pump Casings Caused by Cladding Cracks	Yes, verify that plant-specific program addresses cladding breach	This line item is not applicable at PINGP. PINGP does not have steel with stainless steel cladding pump casings exposed to treated borated water. The charging pumps at PINGP are fabricated from stainless steel. Further evaluation is documented in Section 3.2.2.2.2.
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	Consistent with NUREG-1801 with exception. Exception applies to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. Further evaluation is documented in Section 3.2.2.2.3.1.
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	This line item is not applicable at PINGP. PINGP does not have stainless steel piping, piping components, and piping elements exposed to soil in NUREG-1801 Chapter V systems. Further evaluation is documented in Section 3.2.2.2.3.2.
3.2.1-05	BWR Only				

Table 3.2.1 Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Item Number	Component	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	Consistent with NUREG-1801. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. Further evaluation is documented in Section 3.2.2.2.3.4.
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	This line item is not applicable at PINGP. PINGP does not have stainless steel tanks with breached moisture barrier exposed to raw water in NUREG-1801 Chapter V systems. Further evaluation is documented in Section 3.2.2.2.3.5.
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	This line item is not applicable at PINGP. PINGP does not have stainless steel piping and piping components exposed to condensation in NUREG-1801 Chapter V systems. Further evaluation is documented in Section 3.2.2.2.3.6.
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	Consistent with NUREG-1801. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. Further evaluation is documented in Section 3.2.2.2.4.1.

Table 3.2.1 Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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 with exception. Exception applies to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed with the Water Chemistry Program. The One Time Inspection Program is not required to verify the water chemistry effectiveness for a borated treated water environment as demonstrated in NUREG-1801, line items 3.2.1-48 and 3.2.1-49. Further evaluation is documented in Section 3.2.2.2.4.2.
3.2.1-11	BWR Only				
3.2.1-12	Stainless steel high-pressure safety injection (charging) pump miniflow orifice exposed to treated borated water	Loss of material due to erosion	A plant-specific aging management program is to be evaluated for erosion of the orifice due to extended use of the centrifugal HPSI pump for normal charging.	Yes, plant-specific	This line item is not applicable at PINGP. The PINGP safety injection pumps are not used for normal charging. Further evaluation is documented in Section 3.2.2.2.6.
3.2.1-13	BWR Only				
3.2.1-14	BWR Only				

Table 3.2.1 Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1-15	Steel containment isolation piping, piping components, and piping elements internal surfaces exposed to treated water	Loss of material due to general, pitting, and crevice corrosion	Water Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801 with exception. Exception applies to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. PINGP has added loss of material due to galvanic corrosion as an AERM for 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	Consistent with NUREG-1801. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item. 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	This AMP is not applicable at PINGP. PINGP credits the Buried Piping and Tanks Inspection Program for managing this aging effect. This line item is not applicable at PINGP. PINGP does not have steel (with or without coating or wrapping) piping, piping components, or piping elements buried in soil in NUREG-1801 Chapter V systems. Further evaluation is documented in Section 3.2.2.2.9.
3.2.1-18	BWR Only				
3.2.1-19	BWR Only				

Table 3.2.1 Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1-20	BWR Only				
3.2.1-21	High-strength steel closure bolting exposed to air with steam or water leakage	Cracking due to cyclic loading, stress corrosion cracking	Bolting Integrity	No	This line item is not applicable at PINGP. PINGP does not have high-strength steel closure bolting exposed to air with steam or water leakage in NUREG-1801 Chapter V 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	This line item is not used at PINGP. See line item 3.2.1-23 for further 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 with exception. Exception applies to NUREG-1801 recommendations for the Bolting Integrity Program implementation. This aging effect is managed with the Bolting Integrity 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	Consistent with NUREG-1801 with exception. Exception applies to NUREG-1801 recommendations for the Bolting Integrity Program implementation. This aging effect is managed with the Bolting Integrity Program.
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	Consistent with NUREG-1801. This aging effect is managed with the Closed-Cycle Cooling Water System Program.

Table 3.2.1 Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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	This line item is not applicable at PINGP. PINGP does not have steel piping, piping components, and piping elements exposed to closed-cycle cooling water in NUREG-1801 Chapter V systems.
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 with exception. Exception applies to NUREG-1801 recommendation for the Closed-Cycle Cooling Water System Program implementation. This aging effect is managed with the Closed-Cycle Cooling Water System 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 with exception. Exception applies to NUREG-1801 recommendation for the Closed-Cycle Cooling Water System Program implementation. This aging effect is managed with the Closed-Cycle Cooling Water System 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	Consistent with NUREG-1801 with exception. Exception applies to NUREG-1801 recommendation for the Closed-Cycle Cooling Water System Program implementation. This aging effect is managed with the Closed-Cycle Cooling Water System Program.

Table 3.2.1 Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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 with exception. Exception applies to NUREG-1801 recommendation for the Closed-Cycle Cooling Water System Program implementation. This aging effect is managed with the Closed-Cycle Cooling Water System Program.
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. This aging effect is managed with the External Surfaces Monitoring Program.
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	This line item is not applicable to PINGP. PINGP does not have 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) in NUREG-1801 Chapter V systems.
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	This line item was not used at PINGP. See line item 3.2.1-46 for further discussion.

Table 3.2.1 Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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	This line item is not applicable to PWRs but is applicable to the Emergency Core Cooling Systems in BWRs. NUREG-1800 and NUREG-1801 state that this item is applicable to both PWR and BWR nuclear power plants. However, line item V-D2-17 (E-27) applies to BWR systems only.
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	This line item is not applicable to PINGP. PINGP does not have steel containment isolation piping and components internal surfaces exposed to raw water in NUREG-1801 Chapter V systems.
3.2.1-36	Steel heat exchanger components exposed to raw water	Loss of material due to general, pitting, crevice, galvanic, and microbiologically-influenced corrosion, and fouling	Open-Cycle Cooling Water System	No	This line item is not applicable to PINGP. PINGP does not have steel heat exchanger components exposed to raw water in NUREG-1801 Chapter V systems.
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	This line item is not applicable to PINGP. PINGP does not have stainless steel piping, piping components, and piping elements exposed to raw water in NUREG-1801 Chapter V systems.
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	This line item is not applicable to PINGP. PINGP does not have stainless steel containment isolation piping and components internal surfaces exposed to raw water in NUREG-1801 Chapter V systems.

Table 3.2.1 Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Item Number	Component	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	This line item is not applicable to PINGP. PINGP does not have stainless steel heat exchanger components exposed to raw water in NUREG-1801 Chapter V systems.
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	This line item is not applicable to PINGP. PINGP does not have steel and stainless steel heat exchanger tubes exposed to raw water in NUREG-1801 Chapter V systems.
3.2.1-41	Copper alloy >15% Zn piping, piping components, piping elements, and heat exchanger components exposed to closed cycle cooling water	Loss of material due to selective leaching	Selective Leaching of Materials	No	Consistent with NUREG-1801 with exception. Exception applies to NUREG-1801 recommendations for the Selective Leaching of Materials Program implementation. This aging effect is managed with the Selective Leaching of Materials Program. PINGP does not differentiate between <15% Zn or >15% Zn for copper alloys. Therefore, all copper alloy piping, piping components, piping elements, and heat exchanger components exposed to closed cycle cooling water are evaluated as susceptible to loss of material due to selective leaching.
3.2.1-42	Gray cast iron piping, piping components, piping elements exposed to closed-cycle cooling water	Loss of material due to selective leaching	Selective Leaching of Materials	No	Consistent with NUREG-1801 with exception. Exception applies to NUREG-1801 recommendations for the Selective Leaching of Materials Program implementation. This aging effect is managed with the Selective Leaching of Materials Program.

Table 3.2.1 Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Item Number	Component	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	This line item is not applicable to PINGP. PINGP does not have gray cast iron piping, piping components, and piping elements exposed to soil in NUREG-1801 Chapter V 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	This line item is not applicable to PINGP. PINGP does not have a gray cast iron motor cooler exposed to treated water in GALL Chapter V 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. This aging effect is managed with the Boric Acid Corrosion Program. PINGP does not differentiate between <15% Zn or >15% Zn for copper alloys. Therefore, all copper alloy piping, piping components, and piping elements exposed to air with borated water leakage are evaluated as susceptible to loss of material due to boric acid corrosion.
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	Consistent with NUREG-1801. This aging effect is managed with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program.

Table 3.2.1 Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Item Number	Component	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	This line item is not applicable to PINGP. CASS valve bodies exposed to treated borated water (>482°F) in NUREG-1801 Chapter V are managed for loss of fracture toughness due to thermal aging embrittlement by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program. Further evaluation is documented in line item 3.1.1-55.
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 exception. Exception applies to NUREG-1801 recommendations for the Water Chemistry Program implementation. Aging effect is managed by the Water Chemistry Program.
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 exception. Exception applies to NUREG-1801 recommendations for the Water Chemistry Program implementation. Aging effect is managed by the Water Chemistry Program.
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.
3.2.1-51	Galvanized steel ducting exposed to air - indoor controlled (external)	None	None	NA - No AEM or AMP	This line item is not applicable at PINGP. PINGP does not credit galvanized coatings and evaluates the base material as steel.

Table 3.2.1 Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Item Number	Component	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	Consistent with NUREG-1801.
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.
3.2.1-54	Steel piping, piping components, and piping elements exposed to air - indoor controlled (external)	None	None	NA - No AEM or AMP	This line item was not used at PINGP. PINGP did not credit an air - indoor controlled (external) environment for the evaluation of steel piping, piping components, and piping elements but rather evaluated these components in an air - indoor uncontrolled (external) environment.
3.2.1-55	Steel and stainless steel piping, piping components, and piping elements in concrete	None	None	NA - No AEM or AMP	Further evaluation in Section 3.5.2.2.1.4. concluded that steel components in concrete are not susceptible to aging and do not require aging management. Based on this same rationale, steel and stainless steel piping, piping components, piping elements and miscellaneous structural components in concrete are not susceptible to aging and do not require aging management.
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.

Table 3.2.1 Summary of Aging Management Evaluations in Chapter V of NUREG-1801 for Engineered Safety Features

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1-57	Stainless steel and copper alloy <15% Zn piping, piping components, and piping elements exposed to air with borated water leakage	None	None	NA - No AEM or AMP	Consistent with NUREG-1801 for Stainless Steel. PINGP does not differentiate between <15% Zn or >15% Zn for copper alloys. Therefore, all copper alloy piping, piping components, and piping elements exposed to air with borated water leakage are evaluated as susceptible to loss of material due to boric acid corrosion. See line item 3.2.1-45 for further discussion.

Table 3.2.2-1 Engineered Safety Features - Containment Spray System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.A-4	3.2.1-45	A
				Loss of Material - General Corrosion	Bolting Integrity Program	V.E-4	3.2.1-23	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	V.E-5	3.2.1-24	B, 204
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 204
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.A-4	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A
					Water Chemistry Program	V.C-6	3.2.1-15	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A, 210
					Water Chemistry Program	V.C-6	3.2.1-15	B, 210
				Loss of Material - General Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A
					Water Chemistry Program	V.C-6	3.2.1-15	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A
					Water Chemistry Program	V.C-6	3.2.1-15	B

Table 3.2.2-1 Engineered Safety Features - Containment Spray System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.A-4	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	V.A-9	3.2.1-27	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	V.A-9	3.2.1-27	B
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	V.A-9	3.2.1-27	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	V.A-9	3.2.1-27	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	V.D1-20	3.2.1-42	D
Heat Exchanger Tubes	Heat Transfer	Stainless Steel	Treated Water (Ext)	Heat Transfer Degradation - Fouling	Closed-Cycle Cooling Water System Program	V.A-13	3.2.1-30	B
			Treated Water (Int)	Heat Transfer Degradation - Fouling	Water Chemistry Program	V.A-16	3.2.1-10	E
	Pressure Boundary	Stainless Steel	Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	V.A-7	3.2.1-28	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	V.A-7	3.2.1-28	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	V.A-27	3.2.1-49	D
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.A-27	3.2.1-49	D

Table 3.2.2-1 Engineered Safety Features - Containment Spray System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.A-4	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A
					Water Chemistry Program	V.C-6	3.2.1-15	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A, 210
					Water Chemistry Program	V.C-6	3.2.1-15	B, 210
				Loss of Material - General Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A
					Water Chemistry Program	V.C-6	3.2.1-15	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A
					Water Chemistry Program	V.C-6	3.2.1-15	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	V.A-27	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.A-27	3.2.1-49	B

Table 3.2.2-1 Engineered Safety Features - Containment Spray System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.A-4	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A
					Water Chemistry Program	V.C-6	3.2.1-15	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A, 210
					Water Chemistry Program	V.C-6	3.2.1-15	B, 210
				Loss of Material - General Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A
					Water Chemistry Program	V.C-6	3.2.1-15	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A
					Water Chemistry Program	V.C-6	3.2.1-15	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Primary Containment Air (Ext)	None	None	V.F-13	3.2.1-57	A
			Primary Containment Air (Int)	None	None	V.F-12	3.2.1-53	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	V.C-4	3.2.1-03	A

Table 3.2.2-1 Engineered Safety Features - Containment Spray System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	V.C-4	3.2.1-03	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	V.C-4	3.2.1-03	A
					Water Chemistry Program	V.C-4	3.2.1-03	B
Pump Casings	Pressure Boundary	Cast Austenitic Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	V.A-27	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.A-27	3.2.1-49	B
		Ductile Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.A-4	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A
					Water Chemistry Program	V.C-6	3.2.1-15	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A, 210
					Water Chemistry Program	V.C-6	3.2.1-15	B, 210
				Loss of Material - General Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A
					Water Chemistry Program	V.C-6	3.2.1-15	B

Table 3.2.2-1 Engineered Safety Features - Containment Spray System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Ductile Iron	Treated Water (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A
					Water Chemistry Program	V.C-6	3.2.1-15	B
Restricting Orifices	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	V.A-27	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.A-27	3.2.1-49	B
Sight Glasses	Pressure Boundary	Glass	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-6	3.2.1-52	A
			Treated Water (Int)	None	None	V.F-10	3.2.1-52	A
Spray Nozzles	Spray	Stainless Steel	Primary Containment Air (Ext)	None	None	V.F-13	3.2.1-57	A
			Primary Containment Air (Int)	None	None	V.F-12	3.2.1-53	A
Tanks	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.A-4	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	C
					Water Chemistry Program	V.C-6	3.2.1-15	D

Table 3.2.2-1 Engineered Safety Features - Containment Spray System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Galvanic Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	C, 210
					Water Chemistry Program	V.C-6	3.2.1-15	D, 210
				Loss of Material - General Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	C
					Water Chemistry Program	V.C-6	3.2.1-15	D
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	C
					Water Chemistry Program	V.C-6	3.2.1-15	D
Valve Bodies	Pressure Boundary	Bronze	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.E-11	3.2.1-45	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.A-5	3.4.1-15	A
					Water Chemistry Program	VIII.A-5	3.4.1-15	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.A-5	3.4.1-15	A
					Water Chemistry Program	VIII.A-5	3.4.1-15	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.E-21	3.4.1-35	B
Valve Bodies	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.A-4	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A

Table 3.2.2-1 Engineered Safety Features - Containment Spray System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A
					Water Chemistry Program	V.C-6	3.2.1-15	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A, 210
					Water Chemistry Program	V.C-6	3.2.1-15	B, 210
				Loss of Material - General Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A
					Water Chemistry Program	V.C-6	3.2.1-15	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	V.C-6	3.2.1-15	A
					Water Chemistry Program	V.C-6	3.2.1-15	B
		Cast Austenitic Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	V.A-27	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.A-27	3.2.1-49	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	V.C-4	3.2.1-03	A
					Water Chemistry Program	V.C-4	3.2.1-03	B

Table 3.2.2-1 Engineered Safety Features - Containment Spray System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	V.C-4	3.2.1-03	A
					Water Chemistry Program	V.C-4	3.2.1-03	B

Table 3.2.2-2 Engineered Safety Features - Residual Heat Removal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.D1-1	3.2.1-45	A
				Loss of Material - General Corrosion	Bolting Integrity Program	V.E-4	3.2.1-23	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	V.E-5	3.2.1-24	B, 204
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 204
			Primary Containment Air (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 204
Enclosure Tanks	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.D1-1	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - Boric Acid Wastage	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	V.A-3	3.2.1-46	A
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	V.A-3	3.2.1-46	A
Expansion Joints	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	V.F-12	3.2.1-53	A

Table 3.2.2-2 Engineered Safety Features - Residual Heat Removal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Elements	Filter	Stainless Steel	Primary Containment Air (Ext)	None	None	V.F-13	3.2.1-57	A
Filter / Strainer Housings	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	V.F-13	3.2.1-57	A
			Primary Containment Air (Int)	None	None	V.F-13	3.2.1-57	A
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.D1-1	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	V.D1-6	3.2.1-27	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	V.D1-6	3.2.1-27	B
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	V.D1-6	3.2.1-27	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	V.D1-6	3.2.1-27	B
		Carbon Steel w/ Stainless Steel Clad	Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	V.D1-6	3.2.1-27	B

Table 3.2.2-2 Engineered Safety Features - Residual Heat Removal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Treated Water (Ext)	Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	V.D1-6	3.2.1-27	B
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	V.D1-6	3.2.1-27	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	V.D1-6	3.2.1-27	B
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	V.D1-31	3.2.1-48	D
				Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	D
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	D
		Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.D1-1	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	V.D1-6	3.2.1-27	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	V.D1-6	3.2.1-27	B
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	V.D1-6	3.2.1-27	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	V.D1-6	3.2.1-27	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	V.D1-20	3.2.1-42	D

Table 3.2.2-2 Engineered Safety Features - Residual Heat Removal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	C
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	V.D1-31	3.2.1-48	D
				Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	D
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	D
Heat Exchanger Tubes	Heat Transfer	Stainless Steel	Treated Water (Ext)	Heat Transfer Degradation - Fouling	Closed-Cycle Cooling Water System Program	V.D1-9	3.2.1-30	B
			Treated Water (Int)	Heat Transfer Degradation - Fouling	Water Chemistry Program	V.A-16	3.2.1-10	E
	Pressure Boundary	Stainless Steel	Treated Water (Ext)	Cracking - SCC/IGA	Closed-Cycle Cooling Water System Program	V.D1-23	3.2.1-25	D
				Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	V.D1-4	3.2.1-28	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	V.D1-4	3.2.1-28	B
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	V.D1-31	3.2.1-48	D
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VII.E1-4	3.3.1-02	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	D
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	D

Table 3.2.2-2 Engineered Safety Features - Residual Heat Removal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	V.D1-31	3.2.1-48	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
Piping / Fittings	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Primary Containment Air (Ext)	None	None	V.F-13	3.2.1-57	A
			Primary Containment Air (Int)	None	None	V.F-13	3.2.1-57	A
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-1, IV.C2-2	3.1.1-70, 3.1.1-68	A
					One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program	IV.C2-1	3.1.1-70	A
					Water Chemistry Program	IV.C2-1, IV.C2-2, V.D1-31	3.1.1-70, 3.1.1-68, 3.2.1-48	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	V.D1-27	3.2.1-01	A

Table 3.2.2-2 Engineered Safety Features - Residual Heat Removal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
Pump Casings	Pressure Boundary	Cast Austenitic Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	V.D1-31	3.2.1-48	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
Restricting Orifices	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	V.D1-31	3.2.1-48	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
	Throttle	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	V.D1-31	3.2.1-48	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B

Table 3.2.2-2 Engineered Safety Features - Residual Heat Removal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	V.D1-31	3.2.1-48	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
Valve Bodies	Pressure Boundary	Cast Austenitic Stainless Steel	Primary Containment Air (Ext)	None	None	V.F-13	3.2.1-57	A
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-3	3.1.1-24	E
					Water Chemistry Program	IV.C2-3	3.1.1-24	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Reduction of Fracture Toughness - Thermal Emb't	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-6	3.1.1-55	A
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Primary Containment Air (Ext)	None	None	V.F-13	3.2.1-57	A

Table 3.2.2-2 Engineered Safety Features - Residual Heat Removal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-5	3.1.1-68	A
					Water Chemistry Program	IV.C2-5, V.D1-31	3.1.1-68, 3.2.1-48	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B

Table 3.2.2-3 Engineered Safety Features - Safety Injection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.D1-1	3.2.1-45	A
				Loss of Material - General Corrosion	Bolting Integrity Program	V.E-4	3.2.1-23	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	V.E-5	3.2.1-24	B, 204
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.D1-1	3.2.1-45	A
				Loss of Material - General Corrosion	Bolting Integrity Program	V.E-4	3.2.1-23	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	V.E-5	3.2.1-24	B, 204
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 204
			Primary Containment Air (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 204
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Nitrogen Gas (Int)	None	None	V.F-18	3.2.1-56	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.D1-1	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A

Table 3.2.2-3 Engineered Safety Features - Safety Injection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Brass	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	V.D1-18	3.2.1-06	C
					One-Time Inspection Program	V.D1-18	3.2.1-06	C
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	V.D1-18	3.2.1-06	C
					One-Time Inspection Program	V.D1-18	3.2.1-06	C
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 218
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.E-11	3.2.1-45	C
			Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	V.D1-2	3.2.1-29	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	V.D1-2	3.2.1-29	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	V.D1-3	3.2.1-41	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	V.D1-2	3.2.1-29	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	V.D1-2	3.2.1-29	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	V.D1-3	3.2.1-41	B

Table 3.2.2-3 Engineered Safety Features - Safety Injection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.D1-1	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	V.D1-6	3.2.1-27	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	V.D1-6	3.2.1-27	B
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	V.D1-6	3.2.1-27	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	V.D1-6	3.2.1-27	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	V.D1-20	3.2.1-42	D
Heat Exchanger Tubes	Heat Transfer	Copper Alloy	Lubricating Oil (Int)	Heat Transfer Degradation - Fouling	Lubricating Oil Analysis Program	V.D1-8	3.2.1-09	A
					One-Time Inspection Program	V.D1-8	3.2.1-09	A
			Treated Water (Ext)	Heat Transfer Degradation - Fouling	Closed-Cycle Cooling Water System Program	V.A-11	3.2.1-30	B
		Stainless Steel	Treated Water (Ext)	Heat Transfer Degradation - Fouling	Closed-Cycle Cooling Water System Program	V.D1-9	3.2.1-30	B
			Treated Water (Int)	Heat Transfer Degradation - Fouling	Water Chemistry Program	V.A-16	3.2.1-10	E

Table 3.2.2-3 Engineered Safety Features - Safety Injection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Copper Alloy	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	V.D1-18	3.2.1-06	C
					One-Time Inspection Program	V.D1-18	3.2.1-06	C
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	V.D1-18	3.2.1-06	C
					One-Time Inspection Program	V.D1-18	3.2.1-06	C
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 218
			Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	V.D1-2	3.2.1-29	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	V.D1-2	3.2.1-29	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.E1-3	3.3.1-84	B
		Stainless Steel	Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	V.D1-4	3.2.1-28	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	V.D1-4	3.2.1-28	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	D
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	D

Table 3.2.2-3 Engineered Safety Features - Safety Injection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Primary Containment Air (Ext)	None	None	V.F-13	3.2.1-57	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
Piping / Fittings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	V.D1-28	3.2.1-16	A
					One-Time Inspection Program	V.D1-28	3.2.1-16	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	V.D1-28	3.2.1-16	A, 210
					One-Time Inspection Program	V.D1-28	3.2.1-16	A, 210
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	V.D1-28	3.2.1-16	A
					One-Time Inspection Program	V.D1-28	3.2.1-16	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	V.D1-28	3.2.1-16	A
					One-Time Inspection Program	V.D1-28	3.2.1-16	A
			Nitrogen Gas (Int)	None	None	V.F-18	3.2.1-56	A

Table 3.2.2-3 Engineered Safety Features - Safety Injection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.D1-1	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.D1-1	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
		PVC	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program			F
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program			F
				Cracking - Ozone Exposure	External Surfaces Monitoring Program			F
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program			F
			Treated Water (Int)	None	None			F, 213
		Stainless Steel	Nitrogen Gas (Int)	None	None	V.F-15	3.2.1-56	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Primary Containment Air (Ext)	None	None	V.F-13	3.2.1-57	A

Table 3.2.2-3 Engineered Safety Features - Safety Injection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-1, IV.C2-2	3.1.1-70, 3.1.1-68	A
					One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program	IV.C2-1	3.1.1-70	A
					Water Chemistry Program	IV.C2-1, IV.C2-2, V.D1-31	3.1.1-70, 3.1.1-68, 3.2.1-48	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	V.D1-27	3.2.1-01	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
Pump Casings	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.D1-1	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
		Cast Austenitic Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A

Table 3.2.2-3 Engineered Safety Features - Safety Injection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Cast Austenitic Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
Restricting Orifices	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Primary Containment Air (Ext)	None	None	V.F-13	3.2.1-57	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
	Throttle	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Primary Containment Air (Ext)	None	None	V.F-13	3.2.1-57	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
Tanks	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.D1-1	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A

Table 3.2.2-3 Engineered Safety Features - Safety Injection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
Thermowells	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	V.D1-28	3.2.1-16	A
					One-Time Inspection Program	V.D1-28	3.2.1-16	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	V.D1-28	3.2.1-16	A, 210
					One-Time Inspection Program	V.D1-28	3.2.1-16	A, 210
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	V.D1-28	3.2.1-16	A
					One-Time Inspection Program	V.D1-28	3.2.1-16	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	V.D1-28	3.2.1-16	A
					One-Time Inspection Program	V.D1-28	3.2.1-16	A

Table 3.2.2-3 Engineered Safety Features - Safety Injection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.D1-1	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
Valve Bodies	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	V.D1-28	3.2.1-16	A
					One-Time Inspection Program	V.D1-28	3.2.1-16	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	V.D1-28	3.2.1-16	A, 210
					One-Time Inspection Program	V.D1-28	3.2.1-16	A, 210
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	V.D1-28	3.2.1-16	A
					One-Time Inspection Program	V.D1-28	3.2.1-16	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	V.D1-28	3.2.1-16	A
					One-Time Inspection Program	V.D1-28	3.2.1-16	A
			Nitrogen Gas (Int)	None	None	V.F-18	3.2.1-56	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.D1-1	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A

Table 3.2.2-3 Engineered Safety Features - Safety Injection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	V.D1-1	3.2.1-45	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	V.E-7	3.2.1-31	A
		Cast Austenitic Stainless Steel	Primary Containment Air (Ext)	None	None	V.F-13	3.2.1-57	A
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-3	3.1.1-24	E
					Water Chemistry Program	IV.C2-3	3.1.1-24	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Reduction of Fracture Toughness - Thermal Emb't	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-6	3.1.1-55	A
		Stainless Steel	Nitrogen Gas (Int)	None	None	V.F-15	3.2.1-56	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-12	3.2.1-53	A
			Primary Containment Air (Ext)	None	None	V.F-13	3.2.1-57	A

Table 3.2.2-3 Engineered Safety Features - Safety Injection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-5	3.1.1-68	A
					Water Chemistry Program	IV.C2-5, V.D1-31	3.1.1-68, 3.2.1-48	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
	Throttle	Stainless Steel	Primary Containment Air (Ext)	None	None	V.F-13	3.2.1-57	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	V.D1-30	3.2.1-49	B

Notes for Tables 3.2.2-1 through 3.2.2-3

A Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

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

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

D Component is different, but consistent with NUREG-1801 for material, environment, and aging effect. AMP takes 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 for this component.

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

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

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

J Neither the component nor the material and environment combination are evaluated in NUREG-1801.

Plant-specific notes:

201 Aging mechanism(s) is not in NUREG-1801 for this component, material, and environment combination.

202 Intentionally left blank.

203 Intentionally left blank.

204 There are no bolts with a specified minimum yield strength >150 ksi in this system. Therefore, SCC is not an applicable aging effect/mechanism.

205 A Steam environment is evaluated the same as a Treated Water environment.

206 Components that are buried in the ground are analyzed in the same manner as raw water (damp soil containing groundwater).

207 No credit is taken for protective coatings (paint, galvanized pipe, linings, etc.) for components in the PINGP mechanical aging management evaluations.

208 In some cases where the Plant Chemistry Program is not a viable option and aging effects/mechanisms are not expected to be significant; the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program alone is credited for managing these aging effects. The AMP referenced is appropriate for the aging effect(s)/mechanism(s) identified and provides assurance that the aging effect(s)/mechanism(s) are effectively managed through the period of extended operation.

209 Intentionally left blank.

210 Loss of material due to galvanic corrosion is evaluated in a raw water, treated water, fuel oil, lubricating oil, and wet air/gas (if applicable) environment.

211 The Unit 2 Pressurizer surge nozzle to safe end weld is Alloy 82. Examinations of the weld are conducted by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program.

212 The aging effect/mechanism, cracking due to stress corrosion cracking, was assigned to this component based on industry Operating Experience.

213 Materials science evaluation for this material in this environment results in no aging effects.

214 Unit 2 steam generators are Westinghouse Model 51 Steam Generators and have experienced corrosion. Therefore, additional inspections to detect general and pitting corrosion are performed on the shell to transition cone weld under the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program.

215 Denting of the steam generator U-tubes is only applicable to Unit 2. Unit 1 U-tubes are held in place by stainless steel tube support plates with broached holes.

216 Loss of material due to MIC is evaluated for stainless steel in a raw water environment.

217 Dry/Filtered Instrument Air is evaluated the same as gas.

218 Loss of material due to selective leaching for copper alloys and gray cast iron is evaluated in a fuel oil and lubricating oil environment.

219 The environment for this line item is equivalent to Plant Indoor Air - Uncontrolled with the potential for moisture or condensation.

220 The environment for this component is evaluated as Raw Water and is essentially waste water or a potential mixture of water and oil.

221 This line item includes both heat exchanger components and non-regenerative heat exchanger components.

222 Chrome-molybdenum alloy components are evaluated the same as steel (carbon steel, low-alloy steel and cast iron) components.

223 The External Surfaces Monitoring Program is credited with managing aging effects of internal surfaces where the external surfaces are subject to the same environment or stressor as the internal surfaces such that that external condition is representative of the internal surface condition.

3.3 Aging Management of Auxiliary Systems

3.3.1 Introduction

This section provides the results of the AMR for those components identified in Section 2.3.3, Auxiliary Systems, as being subject to an AMR. The systems, or portions of systems, which are addressed in this section, are described in the indicated sections.

- Auxiliary and Radwaste Area Ventilation System (Section 2.3.3.1)
- Chemical and Volume Control System (Section 2.3.3.2)
- Component Cooling System (Section 2.3.3.3)
- Containment Hydrogen Control System (Section 2.3.3.4)
- Control Room and Miscellaneous Area Ventilation System (Section 2.3.3.5)
- Cooling Water System (Section 2.3.3.6)
- Diesel Generator and Screenhouse Ventilation System (Section 2.3.3.7)
- Diesel Generators and Support System (Section 2.3.3.8)
- Fire Protection System (Section 2.3.3.9)
- Fuel Oil System (Section 2.3.3.10)
- Heating System (Section 2.3.3.11)
- Miscellaneous Gas System (Section 2.3.3.12)
- Plant Sample System (Section 2.3.3.13)
- Primary Containment Ventilation System (Section 2.3.3.14)
- Radiation Monitoring System (Section 2.3.3.15)
- Spent Fuel Pool Cooling System (Section 2.3.3.16)
- Station and Instrument Air System (Section 2.3.3.17)
- Steam Exclusion System (Section 2.3.3.18)
- Turbine and Administration Building Ventilation System (Section 2.3.3.19)
- Waste Disposal System (Section 2.3.3.20)
- Water Treatment System (Section 2.3.3.21)

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 for the Auxiliary Systems components that are relied on for License Renewal. This table uses the format described in Section 3.0. Note that this table only includes those components that are applicable to a PWR.

3.3.2 Results

The following tables summarize the results of the AMR for systems in the Auxiliary Systems group:

Table 3.3.2-1, Auxiliary Systems - Auxiliary and Radwaste Area Ventilation System - Summary of Aging Management Evaluation

Table 3.3.2-2, Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Table 3.3.2-3, Auxiliary Systems - Component Cooling System - Summary of Aging Management Evaluation

Table 3.3.2-4, Auxiliary Systems - Containment Hydrogen Control System - Summary of Aging Management Evaluation

Table 3.3.2-5, Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

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

Table 3.3.2-7, Auxiliary Systems - Diesel Generator and Screenhouse Ventilation System - Summary of Aging Management Evaluation

Table 3.3.2-8, Auxiliary Systems - Diesel Generators and Support System - Summary of Aging Management Evaluation

Table 3.3.2-9, Auxiliary Systems - Fire Protection System - Summary of Aging Management Evaluation

Table 3.3.2-10, Auxiliary Systems - Fuel Oil System - Summary of Aging Management Evaluation

Table 3.3.2-11, Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Table 3.3.2-12, Auxiliary Systems - Miscellaneous Gas System - Summary of Aging Management Evaluation

Table 3.3.2-13, Auxiliary Systems - Plant Sample System - Summary of Aging Management Evaluation

Table 3.3.2-14, Auxiliary Systems - Primary Containment Ventilation System - Summary of Aging Management Evaluation

Table 3.3.2-15, Auxiliary Systems - Radiation Monitoring System - Summary of Aging Management Evaluation

Table 3.3.2-16, Auxiliary Systems - Spent Fuel Pool Cooling System - Summary of Aging Management Evaluation

Table 3.3.2-17, Auxiliary Systems - Station and Instrument Air System - Summary of Aging Management Evaluation

Table 3.3.2-18, Auxiliary Systems - Steam Exclusion System - Summary of Aging Management Evaluation

Table 3.3.2-19, Auxiliary Systems - Turbine and Administration Building Ventilation System - Summary of Aging Management Evaluation

Table 3.3.2-20, Auxiliary Systems - Waste Disposal System - Summary of Aging Management Evaluation

Table 3.3.2-21, Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

The materials that specific components are fabricated from, the environments to which components are exposed, the potential aging effects requiring management, and the aging management programs used to manage these aging effects are provided for each of the above systems in the following subsections of Section 3.3.2.1, Materials, Environment, Aging Effects Requiring Management and Aging Management Programs:

Section 3.3.2.1.1, Auxiliary and Radwaste Area Ventilation System

Section 3.3.2.1.2, Chemical and Volume Control System

Section 3.3.2.1.3, Component Cooling System

Section 3.3.2.1.4, Containment Hydrogen Control System

Section 3.3.2.1.5, Control Room and Miscellaneous Area Ventilation System

Section 3.3.2.1.6, Cooling Water System

Section 3.3.2.1.7, Diesel Generator and Screenhouse Ventilation System

Section 3.3.2.1.8, Diesel Generators and Support System

Section 3.3.2.1.9, Fire Protection System

Section 3.3.2.1.10, Fuel Oil System

Section 3.3.2.1.11, Heating System

Section 3.3.2.1.12, Miscellaneous Gas System

Section 3.3.2.1.13, Plant Sample System

Section 3.3.2.1.14, Primary Containment Ventilation System

Section 3.3.2.1.15, Radiation Monitoring System

Section 3.3.2.1.16, Spent Fuel Pool Cooling System

Section 3.3.2.1.17, Station and Instrument Air System

Section 3.3.2.1.18, Steam Exclusion System

Section 3.3.2.1.19, Turbine and Administration Building Ventilation System

Section 3.3.2.1.20, Waste Disposal System

Section 3.3.2.1.21, Water Treatment System

3.3.2.1 Materials, Environment, Aging Effects Requiring Management and Aging Management Programs

3.3.2.1.1 Auxiliary and Radwaste Area Ventilation System

Materials

The materials of construction for the ZA System components are:

- Bronze
- Carbon Steel
- Copper Alloy
- EPDM
- Galvanized Steel
- Rubber
- Stainless Steel

Environment

The ZA System components are exposed to the following environments:

- Plant Indoor Air - Uncontrolled (External)
- Plant Indoor Air - Uncontrolled (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the ZA System, require management:

- Change in Material Properties - Ozone Exposure
- Change in Material Properties - Thermal Exposure
- Change in Material Properties - Ultraviolet Exposure

- Cracking - Ozone Exposure
- Cracking - Thermal Exposure
- Cracking - Ultraviolet Exposure
- Loss of Material - Boric Acid Wastage
- Loss of Material - General Corrosion
- Loss of Material - Wear
- Loss of Preload - Thermal, Gasket Creep and Loosening

Aging Management Programs

The following AMPs manage the aging effects for the ZA System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- External Surfaces Monitoring Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program

3.3.2.1.2 Chemical and Volume Control System

Materials

The materials of construction for the VC System components are:

- Brass
- Carbon Steel
- Carbon Steel with Stainless Steel Clad
- Cast Austenitic Stainless Steel
- Cast Iron
- Copper Alloy
- Glass
- Stainless Steel

Environment

The VC System components are exposed to the following environments:

- Lubricating Oil (Internal)
- Nitrogen Gas (Internal)

- Plant Indoor Air - Uncontrolled (External)
- Primary Containment Air (External)
- Steam (External)
- Steam (Internal)
- Treated Water (External)
- Treated Water (Internal)
- Wet Air/Gas (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the VC System, require management:

- Cracking - SCC/IGA
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the VC System components:

- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program
- Bolting Integrity Program
- Boric Acid Corrosion Program
- Closed-Cycle Cooling Water System Program
- External Surfaces Monitoring Program
- Lubricating Oil Analysis Program
- One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program
- One-Time Inspection Program

- Selective Leaching of Materials Program
- Water Chemistry Program

3.3.2.1.3 Component Cooling System

Materials

The materials of construction for the CC System components are:

- Brass
- Bronze
- Carbon Steel
- Cast Iron
- Copper Alloy
- Glass
- Stainless Steel

Environment

The CC System components are exposed to the following environments:

- Plant Indoor Air - Uncontrolled (External)
- Primary Containment Air (External)
- Raw Water (Internal)
- Treated Water (External)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the CC System, require management:

- Heat Transfer Degradation - Fouling
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Fouling
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - MIC

- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload -Thermal, gasket creep, loosening

Aging Management Programs

The following AMPs manage the aging effects for the CC System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- Closed-Cycle Cooling Water System Program
- External Surfaces Monitoring Program
- Open-Cycle Cooling Water System Program
- Selective Leaching of Materials Program

3.3.2.1.4 Containment Hydrogen Control System

Materials

The materials of construction for the HC System components are:

- Brass
- Bronze
- Carbon Steel
- Copper Alloy
- Stainless Steel

Environment

The HC System components are exposed to the following environments:

- Dry/Filtered Instrument Air (Internal)
- Plant Indoor Air - Uncontrolled (External)
- Plant Indoor Air - Uncontrolled (Internal)
- Primary Containment Air (External)
- Primary Containment Air (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the HC System, require management:

- Loss of Material - Boric Acid Wastage
- Loss of Material - General Corrosion
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the HC System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- External Surfaces Monitoring Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program

3.3.2.1.5 Control Room and Miscellaneous Area Ventilation System

Materials

The materials of construction for the ZN System components are:

- Aluminum
- Brass
- Bronze
- Carbon Steel
- Cast Iron
- Copper Alloy
- EPDM
- Galvanized Steel
- PVC
- Rubber
- Stainless Steel

Environment

The ZN System components are exposed to the following environments:

- Dry Filtered Instrument Air (Internal)

- Freon Gas (External)
- Freon Gas (Internal)
- Lubricating Oil (Internal)
- Plant Indoor Air - Uncontrolled (External)
- Plant Indoor Air - Uncontrolled (Internal)
- Raw Water (Internal)
- Treated Water (External)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the ZN System, require management:

- Change in Material Properties - Ozone Exposure
- Change in Material Properties - Ultraviolet Exposure
- Cracking - Ozone Exposure
- Cracking - Ultraviolet Exposure
- Heat Transfer Degradation - Fouling
- Loss of Material - Crevice Corrosion
- Loss of Material - Erosion
- Loss of Material - Fouling
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - MIC
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Material - Wear
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the ZN System components:

- Bolting Integrity Program
- Closed-Cycle Cooling Water System Program

- External Surfaces Monitoring Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program
- Lubricating Oil Analysis Program
- One-Time Inspection Program
- Open-Cycle Cooling Water System Program
- Selective Leaching of Materials Program
- Water Chemistry Program

3.3.2.1.6 Cooling Water System

Materials

The materials of construction for the CL System components are:

- Brass
- Bronze
- Carbon Steel
- Cast Iron
- Copper Alloy
- Glass
- PVC
- PVDF
- Stainless Steel

Environment

The CL System components are exposed to the following environments:

- Buried (External)
- Freon Gas (Internal)
- Lubricating Oil (Internal)
- Plant Indoor Air - Uncontrolled (External)
- Plant Indoor Air - Uncontrolled (Internal)
- Primary Containment Air (External)
- Raw Water (External)
- Raw Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the CL System, require management:

- Change in Material Properties - Ozone Exposure
- Change in Material Properties - Ultraviolet Exposure
- Cracking - Ozone Exposure
- Cracking - Ultraviolet Exposure
- Heat Transfer Degradation - Fouling
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Erosion
- Loss of Material - Fouling
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - MIC
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal Effects, Gasket Creep and Loosening

Aging Management Programs

The following AMPs manage the aging effects for the CL System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- Buried Piping and Tanks Inspection Program
- External Surfaces Monitoring Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program
- Lubricating Oil Analysis Program
- One-Time Inspection Program
- Open-Cycle Cooling Water System Program
- Selective Leaching of Materials Program

3.3.2.1.7 Diesel Generator and Screenhouse Ventilation System

Materials

The materials of construction for the ZG System components are:

- ABS
- Carbon Steel
- Copper Alloy
- EPDM
- Galvanized Steel

Environment

The ZG System components are exposed to the following environments:

- Outdoor Air - Sheltered (External)
- Plant Indoor Air - Uncontrolled (External)
- Plant Indoor Air - Uncontrolled (Internal)
- Raw Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the ZG System, require management:

- Change in Material Properties - Ozone Exposure
- Change in Material Properties - Ultraviolet Exposure
- Cracking - Ozone Exposure
- Cracking - Ultraviolet Exposure
- Loss of Material - Crevice Corrosion
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - MIC
- Loss of Material - Pitting Corrosion
- Loss of Material - Wear
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the ZG System components:

- Bolting Integrity Program
- External Surfaces Monitoring Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program

3.3.2.1.8 Diesel Generators and Support System

Materials

The materials of construction for the DG System components are:

- Aluminum
- Brass
- Bronze
- Carbon Steel
- Cast Iron
- Copper Alloy
- Glass
- Natural Rubber
- Stainless Steel

Environment

The DG System components are exposed to the following environments:

- Diesel Exhaust (Internal)
- Fuel Oil (Internal)
- Hydraulic Oil (External)
- Hydraulic Oil (Internal)
- Lubricating Oil (External)
- Lubricating Oil (Internal)
- Outdoor Air - Not Sheltered (External)
- Plant Indoor Air - Uncontrolled (External)
- Plant Indoor Air - Uncontrolled (Internal)
- Raw Water (Internal)

- Treated Water (External)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the DG System, require management:

- Change in Material Properties - Ozone Exposure
- Change in Material Properties - Thermal Exposure
- Change in Material Properties - Ultraviolet Exposure
- Cracking - Ozone Exposure
- Cracking - SCC/IGA
- Cracking - Stress Corrosion Cracking (SCC)
- Cracking - Thermal Exposure
- Cracking - Ultraviolet Exposure
- Heat Transfer Degradation - Fouling
- Loss of Material - Crevice Corrosion
- Loss of Material - Fouling
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - MIC
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the DG System components:

- Bolting Integrity Program
- Closed-Cycle Cooling Water System Program
- External Surfaces Monitoring Program
- Fuel Oil Chemistry Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program

- Lubricating Oil Analysis Program
- One-Time Inspection Program
- Open-Cycle Cooling Water System Program
- Selective Leaching of Materials Program

3.3.2.1.9 Fire Protection System

Materials

The materials of construction for the FP System components are:

- Aluminum
- Brass
- Bronze
- Carbon Steel
- Cast Iron
- Copper Alloy
- Natural Rubber
- Neoprene
- Rubber
- Stainless Steel

Environment

The FP System components are exposed to the following environments:

- Air/Gas (Internal)
- Buried (External)
- Carbon Dioxide Gas (Internal)
- Dry/Filtered Instrument Air (Internal)
- Fuel Oil (Internal)
- Halon Gas (Internal)
- Lubricating Oil (Internal)
- Outdoor Air - Not Sheltered (External)
- Outdoor Air - Sheltered (External)
- Plant Indoor Air - Uncontrolled (External)
- Plant Indoor Air - Uncontrolled (Internal)

- Primary Containment Air (External)
- Primary Containment Air (Internal)
- Raw Water (External)
- Raw Water (Internal)
- Treated Water (External)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the FP System, require management:

- Change in Material Properties - Ozone Exposure
- Change in Material Properties - Thermal Exposure
- Change in Material Properties - Ultraviolet Exposure
- Cracking - Ozone Exposure
- Cracking - SCC/IGA
- Cracking - Thermal Exposure
- Cracking - Ultraviolet Exposure
- Heat Transfer Degradation - Fouling
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Fouling
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - MIC
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, gasket creep, loosening

Aging Management Programs

The following AMPs manage the aging effects for the FP System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program

- Buried Piping and Tanks Inspection Program
- Closed-Cycle Cooling Water System Program
- External Surfaces Monitoring Program
- Fire Protection Program
- Fire Water System Program
- Fuel Oil Chemistry Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program
- Lubricating Oil Analysis Program
- One-Time Inspection Program
- Selective Leaching of Materials Program

3.3.2.1.10 Fuel Oil System

Materials

The materials of construction for the FO System components are:

- Aluminum
- Brass
- Bronze
- Carbon Steel
- Cast Iron
- Copper Alloy
- Glass
- Stainless Steel

Environment

The FO System components are exposed to the following environments:

- Buried (External)
- Fuel Oil (External)
- Fuel Oil (Internal)
- Outdoor Air - Not Sheltered (External)
- Plant Indoor Air - Uncontrolled (External)
- Plant Indoor Air - Uncontrolled (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the FO System, require management:

- Cracking - SCC/IGA
- Loss of Material - Crevice Corrosion
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - MIC
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, gasket creep, loosening

Aging Management Programs

The following AMPs manage the aging effects for the FO System components:

- Bolting Integrity Program
- Buried Piping and Tanks Inspection Program
- External Surfaces Monitoring Program
- Fuel Oil Chemistry Program
- One-Time Inspection Program
- Selective Leaching of Materials Program

3.3.2.1.11 Heating System

Materials

The materials of construction for the HS System components are:

- Brass
- Bronze
- Carbon Steel
- Cast Iron
- Copper Alloy
- Ductile Iron
- Glass
- Stainless Steel

Environment

The HS System components are exposed to the following environments:

- Plant Indoor Air - Uncontrolled (External)
- Steam (Internal)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the HS System, require management:

- Cracking - SCC/IGA
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - FAC
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the HS System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- Closed-Cycle Cooling Water System Program
- External Surfaces Monitoring Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Selective Leaching of Materials Program
- Water Chemistry Program

3.3.2.1.12 Miscellaneous Gas System

Materials

The materials of construction for the CG System components are:

- Carbon Steel
- Stainless Steel

Environment

The CG System components are exposed to the following environments:

- Nitrogen Gas (Internal)
- Plant Indoor Air - Uncontrolled (External)
- Primary Containment Air (External)

Aging Effects Requiring Management

The following aging effects, associated with the CG System, require management:

- Loss of Material - Boric Acid Wastage
- Loss of Material - General Corrosion
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the CG System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- External Surfaces Monitoring Program

3.3.2.1.13 Plant Sample System

Materials

The materials of construction for the SM System components are:

- Brass
- Carbon Steel
- Cast Iron
- Copper Alloy

- Glass
- Stainless Steel

Environment

The SM System components are exposed to the following environments:

- Freon Gas (Internal)
- Plant Indoor Air - Uncontrolled (External)
- Primary Containment Air (External)
- Treated Water (External)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the SM System, require management:

- Cracking - SCC/IGA
- Cracking - Stress Corrosion Cracking (SCC)
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - MIC
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the SM System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- Closed-Cycle Cooling Water System Program
- External Surfaces Monitoring Program
- One-Time Inspection Program

- Selective Leaching of Materials Program
- Water Chemistry Program

3.3.2.1.14 Primary Containment Ventilation System

Materials

The materials of construction for the ZC System components are:

- Carbon Steel
- Copper Alloy
- Copper-Nickel
- EPDM
- Galvanized Steel
- Rubber
- Stainless Steel

Environment

The ZC System components are exposed to the following environments:

- Outdoor Air - Not Sheltered (External)
- Plant Indoor Air - Uncontrolled (External)
- Plant Indoor Air - Uncontrolled (Internal)
- Primary Containment Air (External)
- Primary Containment Air (Internal)
- Raw Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the ZC System, require management:

- Change in Material Properties - Ozone Exposure
- Change in Material Properties - Thermal Exposure
- Change in Material Properties - Ultraviolet Exposure
- Cracking - Ozone Exposure
- Cracking - Thermal Exposure
- Cracking - Ultraviolet Exposure

- Heat Transfer Degradation - Fouling
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Erosion
- Loss of Material - Fouling
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - MIC
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Material - Wear
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the ZC System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- External Surfaces Monitoring Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program
- Open-Cycle Cooling Water System Program
- Selective Leaching of Materials Program

3.3.2.1.15 Radiation Monitoring System

Materials

The materials of construction for the RD System components are:

- Brass
- Carbon Steel
- Stainless Steel

Environment

The RD System components are exposed to the following environments:

- Plant Indoor Air - Uncontrolled (External)
- Plant Indoor Air - Uncontrolled (Internal)
- Primary Containment Air (External)
- Primary Containment Air (Internal)
- Raw Water (Internal)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the RD System, require management:

- Cracking - SCC/IGA
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Fouling
- Loss of Material - General Corrosion
- Loss of Material - MIC
- Loss of Material - Pitting Corrosion
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the RD System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- Closed-Cycle Cooling Water System Program
- External Surfaces Monitoring Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program
- One-Time Inspection Program
- Open-Cycle Cooling Water System Program
- Water Chemistry Program

3.3.2.1.16 Spent Fuel Pool Cooling System

Materials

The materials of construction for the SF System components are:

- Carbon Steel
- Stainless Steel

Environment

The SF System components are exposed to the following environments:

- Plant Indoor Air - Uncontrolled (External)
- Treated Water (External)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the SF System, require management:

- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - Pitting Corrosion
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the SF System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- Closed-Cycle Cooling Water System Program
- External Surfaces Monitoring Program
- Water Chemistry Program

3.3.2.1.17 Station and Instrument Air System

Materials

The materials of construction for the SA System components are:

- Aluminum
- Brass
- Bronze
- Carbon Steel
- Cast Iron
- Copper Alloy
- Galvanized Steel
- Glass
- PVC
- Stainless Steel

Environment

The SA System components are exposed to the following environments:

- Buried (External)
- Dry/Filtered Instrument Air (Internal)
- Plant Indoor Air - Uncontrolled (External)
- Primary Containment Air (External)
- Raw Water (External)
- Raw Water (Internal)
- Wet Air/Gas (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the SA System, require management:

- Change in Material Properties - Ozone Exposure
- Change in Material Properties-Ultraviolet Exposure
- Cracking - Ozone Exposure
- Cracking - Ultraviolet Exposure
- Loss of Material - Boric Acid Wastage

- Loss of Material - Crevice Corrosion
- Loss of Material - Fouling
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - MIC
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the SA System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- Buried Piping and Tanks Inspection Program
- Compressed Air Monitoring Program
- External Surfaces Monitoring Program
- Open-Cycle Cooling Water System Program
- Selective Leaching of Materials Program

3.3.2.1.18 Steam Exclusion System

Materials

The materials of construction for the SE System components are:

- Carbon Steel
- Galvanized Steel

Environment

The SE System components are exposed to the following environments:

- Plant Indoor Air - Uncontrolled (External)
- Plant Indoor Air - Uncontrolled (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the SE System, require management:

- Loss of Material - Boric Acid Wastage
- Loss of Material - General Corrosion
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the SE System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- External Surfaces Monitoring Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program

3.3.2.1.19 Turbine and Administration Building Ventilation System

Materials

The materials of construction for the ZB System components are:

- Carbon Steel
- Galvanized Steel
- Stainless Steel

Environment

The ZB System components are exposed to the following environments:

- Plant Indoor Air - Uncontrolled (External)
- Plant Indoor Air - Uncontrolled (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the ZB System, require management:

- Loss of Material - General Corrosion
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the ZB System components:

- Bolting Integrity Program
- External Surfaces Monitoring Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program

3.3.2.1.20 Waste Disposal System

Materials

The materials of construction for the WD System components are:

- Brass
- Bronze
- Carbon Steel
- Cast Austenitic Stainless Steel
- Cast Iron
- Copper Alloy
- Glass
- Natural Rubber
- PVC
- Stainless Steel

Environment

The WD System components are exposed to the following environments:

- Plant Indoor Air - Uncontrolled (External)
- Primary Containment Air (External)
- Raw Water (External)
- Raw Water (Internal)
- Treated Water (External)
- Treated Water (Internal)
- Wet Air / Gas (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the WD System, require management:

- Change in Material Properties - Ozone Exposure
- Change in Material Properties - Ultraviolet Exposure
- Cracking - Ozone Exposure
- Cracking - Ultraviolet Exposure
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - MIC
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the WD System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- Closed-Cycle Cooling Water System Program
- External Surfaces Monitoring Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program
- Selective Leaching of Materials Program

3.3.2.1.21 **Water Treatment System**

Materials

The materials of construction for the DE System components are:

- Brass
- Bronze
- Carbon Steel

- Cast Iron
- Copper Alloy
- Fiberglass
- Glass
- PVC
- Stainless Steel

Environment

The DE System components are exposed to the following environments:

- Dry/Filtered Instrument Air (Internal)
- Lubricating Oil (Internal)
- Plant Indoor Air - Uncontrolled (External)
- Primary Containment Air - Uncontrolled (External)
- Raw Water (Internal)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the DE System, require management:

- Change in Material Properties - Ozone Exposure
- Change in Material Properties - Ultraviolet Exposure
- Cracking - Ozone Exposure
- Cracking - Ultraviolet Exposure
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - MIC
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the DE System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- External Surfaces Monitoring Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program
- Lubricating Oil Analysis Program
- One-Time Inspection Program
- Selective Leaching of Materials Program
- Water Chemistry Program

3.3.2.2 Further Evaluation of Aging Management as Recommended by NUREG-1801

NUREG-1801 Volume 1 Tables provide the basis for identifying those programs that warrant further evaluation by the reviewer in the LRA. For the Auxiliary Systems, those programs are addressed in the following sections.

3.3.2.2.1 Cumulative Fatigue Damage

Fatigue of cranes is a TLAA 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 the TLAAs for cranes is addressed in Section 4.7.4 of the LRA.

Fatigue of metal components in auxiliary systems is a TLAA as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). These TLAAs are addressed in Section 4.3 of the LRA.

3.3.2.2.2 Reduction of Heat Transfer due to Fouling

NUREG-1800 and NUREG-1801 state that this item is applicable to both PWR and BWR nuclear power plants. However, line items VII.A4-4 (AP-62) and VII.E3-6 (AP-62) apply to BWR systems only.

3.3.2.2.3 Cracking due to Stress Corrosion Cracking (SCC)

1. BWR Only

2. NUREG-1800 and NUREG-1801 incorrectly state that this item is applicable to both PWR and BWR nuclear power plants. However, line items VII.E3-3 (A-71) and VII.E3-19 (A-85) apply to BWR systems only.

3. Cracking due to stress corrosion cracking could occur in stainless steel diesel engine exhaust piping, piping components, and piping elements exposed to diesel exhaust. This aging effect is managed with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program. The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program performs internal inspections during scheduled preventive and corrective maintenance activities, or during other routinely scheduled tasks such as surveillance procedures, when the surfaces are made accessible for visual inspection. These inspections are performed to provide assurance that existing environmental conditions are not causing degradation. This program assures the intended function of affected components will be maintained during the period of extended operation.

3.3.2.2.4 Cracking due to Stress Corrosion Cracking and Cyclic Loading

1. Cracking due to stress corrosion cracking and cyclic loading could occur in stainless steel non-regenerative heat exchanger components exposed to treated water greater than 140°F. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs 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 temperature and radioactivity monitoring of the shell side water and eddy current testing of tubes.

   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. Section 3.3.2.2.8 of the applicant's Safety Evaluation Report states:

"In LRA Table 3.3-1, row 8 the applicant stated that stress corrosion cracking (SCC) is an applicable aging mechanism for the seal water, excess letdown, and regenerative heat exchangers.

The applicant credited the Water Chemistry Program for managing the crack initiation and growth due to SCC in these heat exchangers and the Closed-Cycle Cooling Water System Program for managing the aging effect for heat exchangers cooled by the CCW system. To verify the effectiveness of the Water Chemistry Program in preventing cracking due to SCC, the applicant credited an inspection of small-bore Class 1 piping system and components connected to the RCS under the One-Time Inspection Program in selected locations where degradation would be expected. The applicant stated that management of SCC for this group is consistent with the GALL Report with the exception that the onetime inspection will be used instead of the eddy current testing recommended in the GALL Report. The Water Chemistry Program and the One-Time Inspection Program are evaluated in Sections 3.0.3.3 and 3.0.3.9 of this SER. The staff finds that these programs can effectively manage the cracking initiation and growth due to SCC for the above components that are applicable to RNP auxiliary systems.

On the basis of its review, the staff finds that the applicant has adequately evaluated the management of crack initiation and growth due to SCC and cyclic loading for components in the auxiliary systems, as recommended in the GALL Report. On the basis of this finding, and the finding that the remainder of the applicant's program is consistent with GALL, the staff concludes that the applicant has demonstrated that these aging effects will be adequately managed so that the intended functions will be maintained consistent with the CLB during the period of extended operation."

2. Cracking due to stress corrosion cracking and cyclic loading could occur in stainless steel regenerative heat exchanger components exposed to treated water greater than 140°F. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. See Section 3.3.2.2.4.1 for additional details.

3. Cracking due to stress corrosion cracking and cyclic loading could occur for stainless steel high-pressure pump casing in PWR chemical and volume control system. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. The Water Chemistry Program includes specifications for chemical species,

sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation.

4. Although there have been industry instances of cracking of carbon steel and low-alloy steel bolting due to stress corrosion cracking, these failures have been attributed to high yield strength materials (>150 ksi), leaking gaskets, and exposure to contaminants such as lubricants containing molybdenum disulfide. PINGP does not have high-strength steel closure bolting exposed to air with steam or water leakage in NUREG-1801 Chapter VII systems.

3.3.2.2.5 **Hardening and Loss of Strength due to Elastomer Degradation**

1. Hardening and loss of strength due to elastomer degradation could occur in seals and components of HVAC and other plant systems exposed to Plant Indoor Air-Uncontrolled (internal or external), Primary Containment Air, Raw Water and Treated Water. These aging effects are managed with the External Surfaces Monitoring Program. The External Surfaces Monitoring Program performs periodic system inspections and walkdowns to visually inspect accessible external surfaces for degradation. The External Surfaces Monitoring Program is credited with managing aging effects of internal surfaces where the external surfaces are subject to the same environment or stressor as the internal surfaces such that that external condition is representative of the internal surface condition. This program assures the intended function of affected components will be maintained during the period of extended operation. PINGP added change in material properties due to ultraviolet radiation and ozone exposure and, cracking due to ultraviolet radiation and ozone exposure for non-metallics, both elastomers and plastics (PVC, fiberglass, neoprene, rubber, etc.), in an internal and external air/gas environment, as an AERM for this line item.

2. Hardening and loss of strength due to elastomer degradation could occur in elastomer lining exposed to treated water or treated borated water.

PINGP does not have Spent Fuel Pool Cooling and Cleanup elastomer lined components exposed to treated water or treated borated water.

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

Reduction of neutron-absorbing capacity and loss of material due to general corrosion could occur in boral, boron steel spent fuel storage racks neutron absorbing sheets exposed to treated water or treated borated water. PINGP does not have boral, boron steel spent fuel storage racks neutron-absorbing sheets exposed to treated water or treated borated water.

3.3.2.2.7 Loss of Material due to General, Pitting, and Crevice Corrosion

1. PART I

   Loss of material due to general, pitting, and crevice corrosion could occur in steel components exposed to lubricating oil. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. The Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results. The program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.

   PART II

   See Section 3.3.2.2.7.1 PART I.

   PART III

   Loss of material due to general, pitting, and crevice corrosion could occur in the steel reactor coolant pump oil collection system tank exposed to lubricating oil. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. The Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results. The program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.

2. BWR Only

3. 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. This aging effect is managed with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program. The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program performs internal inspections during scheduled preventive and corrective maintenance activities, or during other routinely scheduled tasks such as surveillance procedures, when the surfaces are made accessible for visual inspection. These inspections are performed to provide assurance that existing environmental conditions are not causing degradation. This program assures the intended function of affected components will be maintained during the period of extended operation.

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. This aging effect is managed with the Buried Piping and Tanks Inspection Program. The Buried Piping and Tanks Inspection Program includes preventive measures to mitigate degradation (e.g., coatings and wrappings required by design) and visual inspections of external surfaces of buried piping components, when excavated, for evidence of coating damage and degradation. The inspections either verify that unacceptable degradation is not occurring or trigger additional actions. This program assures the intended function of affected components will be maintained during the period of extended operation. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.

3.3.2.2.9 **Loss of Material due to General, Pitting, Crevice, Microbiologically-Influenced Corrosion and Fouling**

1. Loss of material due to general, pitting, crevice, MIC, and fouling could occur for steel piping, piping components, piping elements, and tanks exposed to fuel oil. This aging effect is managed with a combination of the Fuel Oil Chemistry Program and the One-Time Inspection Program. The Fuel Oil Chemistry Program includes periodic sampling and testing of fuel oil, integrity testing, visual inspection and one-time inspections of selected components. These activities verify the absence of unacceptable aging effects and assure the continued effectiveness of fuel oil chemistry control activities to ensure that degradation is not occurring. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation. PINGP excludes loss of material due to fouling in a fuel oil environment based on plant-specific operating experience.

2. Loss of material due to general, pitting, crevice, MIC, and fouling could occur for steel heat exchanger components exposed to lubricating oil. PINGP excludes loss of material due to fouling or microbiologically influenced corrosion in a lubricating oil environment based on plant-specific operating experience. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. The Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results. The program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. Components containing hydraulic fluid and not lubricating oil are also managed by the Lubricating Oil Analysis Program and the One-Time Inspection Program. These programs assure the intended function of affected components will be maintained during the period of extended operation. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.

3.3.2.2.10 Loss of Material due to Pitting and Crevice Corrosion

1. Loss of material due to pitting and crevice corrosion (only for steel after lining/cladding degradation) could occur for steel with elastomer lining or stainless steel cladding piping, piping components, and piping elements exposed to treated water and treated borated water. PINGP Spent Fuel Pool Cooling and Cleanup components do not have elastomer lining.

2. NUREG-1800 identifies this line item as applicable to BWR and PWR plants. Line items VII.A4-11, VII.E3-15, VII.E4-14, VII.A4-5, VII.E3-7, and VII.E4-4 apply only to BWR plants.

3. Loss of material due to pitting and crevice corrosion of copper alloy of HVAC piping, piping components, and piping elements exposed to condensation (external) was not identified at PINGP. PINGP does not have any copper components in the HVAC systems that are exposed to a concentration of contaminants or have a surface that is exposed to an aggressive environment in outdoor locations.

4. Loss of material due to pitting and crevice corrosion could occur for copper alloy piping, piping components, and piping elements exposed to lubricating oil. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. The Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results. The program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. Components containing hydraulic fluid and not lubricating oil are also managed by the Lubricating Oil Analysis Program and the One-Time Inspection Program. These programs assure the intended function of affected components will be maintained during the period of extended operation.

5. Loss of material due to pitting and crevice corrosion could occur for stainless steel HVAC ducting and aluminum HVAC piping, piping components and piping elements exposed to condensation. This aging effect is managed with the Compressed Air Monitoring Program. The Compressed Air Monitoring Program performs periodic air quality

sampling, inspections, component functional testing, and leakage testing. Additionally, preventive maintenance is performed at regular intervals to assure system components continue to operate reliably, thereby assuring that quality air is supplied to plant equipment. This program assures the intended function of affected components will be maintained during the period of extended operation.

6. Loss of material due to pitting and crevice corrosion could occur for copper alloy piping, piping components, and piping elements exposed to condensation (internal). This aging effect is managed with the Compressed Air Monitoring Program. The Compressed Air Monitoring Program performs periodic air quality sampling, inspections, component functional testing, and leakage testing. Additionally, preventive maintenance is performed at regular intervals to assure system components continue to operate reliably, thereby assuring that quality air is supplied to plant equipment. This program assures the intended function of affected components will be maintained during the period of extended operation.
7. Loss of material due to pitting and crevice corrosion could occur for stainless steel piping, piping components, and piping elements exposed to soil. PINGP Auxiliary Systems do not contain stainless steel components exposed to soil.
8. BWR Only

3.3.2.2.11 Loss of Material due to Pitting, Crevice, and Galvanic Corrosion

BWR Only

3.3.2.2.12 Loss of Material due to Pitting, Crevice, and Microbiologically-Influenced Corrosion

1. Loss of material due to pitting, crevice, and MIC could occur in stainless steel, aluminum, and copper alloy piping, piping components, and piping elements exposed to fuel oil. This aging effect is managed with the Fuel Oil Chemistry Program, the One-Time Inspection Program and the Fire Protection Program. The Fuel Oil Chemistry Program includes periodic sampling and testing of fuel oil, integrity testing, visual inspection and one-time inspections of selected components. These activities verify the absence of unacceptable aging effects and assure the continued effectiveness of fuel oil chemistry control activities to ensure that

degradation is not occurring. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. The Fire Protection Program provides diesel-driven fire pump inspection activities that require the pump to be periodically performance tested to ensure that the fuel supply line can perform its intended function. The fuel supply line intended function is confirmed by visually inspecting the diesel engine and its fuel supply line, and by starting and running the diesel-driven fire pump. These programs assure the intended function of affected components will be maintained during the period of extended operation. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.

2. Loss of material due to pitting, crevice, and MIC could occur in stainless steel, piping, piping components, and piping elements exposed to lubricating oil. PINGP excludes loss of material due to microbiologically influenced corrosion in a lubricating oil environment based on plant-specific operating experience. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. The Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results. The program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. Components containing hydraulic fluid and not lubricating oil are also managed by the Lubricating Oil Analysis Program and the One-Time Inspection Program. These programs 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 elastomer seals and components in an indoor air environment (internal or external). This aging effect is managed with the External Surfaces Monitoring Program. The External Surfaces Monitoring Program performs periodic system inspections and walkdowns to visually inspect accessible external surfaces for degradation. The External Surfaces Monitoring Program is credited with managing aging effects of internal surfaces where the external surfaces are subject to the same environment or stressor as the internal surfaces such that that external condition is representative of the internal surface condition. This program assures the intended function of affected components will be maintained during the period of extended operation.

3.3.2.2.14 Loss of Material due to Cladding Breach

NRC Information Notice 94-63 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 charging pumps at PINGP are fabricated from stainless steel and not from carbon steel with stainless steel cladding.

3.3.2.3 Time-Limited Aging Analyses

The TLAAs identified below are associated with the Auxiliary Systems components. The section of the LRA that contains the TLAA review results is indicated in parenthesis.

- Metal Fatigue (Section 4.3)

3.3.3 Conclusion

The Auxiliary System piping, fittings, and components that are subject to an AMR have been identified in accordance with the requirements of 10 CFR 54.4. The AMPs selected to manage aging effects for the Auxiliary Systems components are identified in the summary tables and Section 3.3.2.1.

A description of these AMPs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation.

Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the Auxiliary System components will be adequately managed so that there is reasonable assurance that the intended function(s) 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

Item Number	Component	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	Fatigue of cranes is addressed as a TLAA. 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	Fatigue of metal components in auxiliary systems is addressed as a TLAA. Further evaluation is documented in Section 3.3.2.2.1.
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	This line item is not applicable to PWRs but is applicable to the Auxiliary Systems in BWRs. Further evaluation is documented in Section 3.3.2.2.2.
3.3.1-04	BWR Only				
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	This line item is not applicable to PWRs but is applicable to the Auxiliary Systems in BWRs. 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	The plant-specific AMP that manages cracking due to stress corrosion cracking of stainless steel diesel engine exhaust piping, piping components, and piping elements exposed to diesel exhaust is the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program. Further evaluation is documented in Section 3.3.2.2.3.3.

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

Item Number	Component	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	The plant-specific AMP that manages cracking due to stress corrosion cracking and cyclic loading of stainless steel non-regenerative heat exchanger components exposed to treated borated water >60°C (>140°F) in addition to the Water Chemistry Program is the One-Time Inspection Program. Further evaluation is documented in Section 3.3.2.2.4.1.
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	The plant-specific AMP that manages cracking due to stress corrosion cracking and cyclic loading of stainless steel regenerative heat exchanger components exposed to treated borated water >60°C (>140°F) in addition to the Water Chemistry Program is the One-Time Inspection Program. 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	The plant-specific AMP that manages cracking due to stress corrosion cracking and cyclic loading which could occur for stainless steel high-pressure pump casing in PWR chemical and volume control system in addition to the Water Chemistry Program is the One-Time Inspection Program. Further evaluation is documented in Section 3.3.2.2.4.3.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-10	High-strength steel closure bolting exposed to air with steam or water leakage.	Cracking due to stress corrosion cracking, cyclic loading	Bolting Integrity 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	This line item is not applicable to PINGP. PINGP does not have high-strength steel closure bolting exposed to air with steam or water leakage in NUREG-1801 Chapter VII systems. 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	The plant-specific AMP used to manage hardening and loss of strength due to elastomer degradation of elastomer seals and components exposed to Plant Indoor Air-Uncontrolled (internal/external), Primary Containment Air, Raw Water and Treated Water is the External Surfaces Monitoring Program. PINGP added change in material properties due to ultraviolet radiation and ozone exposure and, cracking due to ultraviolet radiation and ozone exposure for non-metallics, both elastomers and plastics (PVC, fiberglass, neoprene, rubber, etc.), in an internal and external air/gas environment, as an AERM for this line item. 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	This line item is not applicable to PINGP. PINGP does not have elastomer lining exposed to treated water or treated borated water in GALL Chapter VII systems. Further evaluation is documents in Section 3.3.2.2.5.2.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-13	Boral, boron steel spent fuel storage racks neutron-absorbing sheets exposed to treated water or treated borated water	Reduction of neutron-absorbing capacity and loss of material due to general corrosion	Plant specific	Yes, plant specific	This line item is not applicable to PINGP. PINGP does not have boral, boron steel spent fuel storage racks neutron-absorbing sheets exposed to treated water or treated borated water. 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. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and One-Time Inspection Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item. Further evaluation is documented in Section 3.3.2.2.7.1 PART I.
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. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and One-Time Inspection Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item. Further evaluation is documented in Section 3.3.2.2.7.1 PART II.
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. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item. Further evaluation is documented in Section 3.3.2.2.7.1 PART III.
3.3.1-17	BWR Only				

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-18	Stainless steel and steel diesel engine exhaust piping, piping components, and piping elements exposed to diesel exhaust	Loss of material/ general (steel only), pitting and crevice corrosion	Plant specific	Yes, plant specific	The plant-specific AMP used to manage loss of material/ general (steel only), pitting and crevice corrosion of stainless steel and steel diesel engine exhaust piping, piping components, and piping elements exposed to diesel exhaust is the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program. Further evaluation is documented in Section 3.3.2.2.7.3.
3.3.1-19	Steel (with or without coating or wrapping) piping, piping components, and piping elements exposed to soil	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion	Buried Piping and Tanks Surveillance or	No	This AMP is not applicable at PINGP. PINGP credits the Buried Piping and Tanks Inspection Program for managing this aging effect.
			Buried Piping and Tanks Inspection	Yes, detection of aging effects and operating experience are to be further evaluated	Consistent with NUREG-1801. Aging effect is managed with the Buried Piping and Tanks Inspection Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item. 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 exception. Exceptions apply to NUREG-1801 recommendations for the Fuel Oil Chemistry Program implementation. This aging effect is managed with a combination of the Fuel Oil Chemistry Program and the One-Time Inspection Program. PINGP excludes loss of material due to fouling in a fuel oil environment. PINGP added loss of material due to galvanic corrosion as an AERM for this line item. Further evaluation is documented in Section 3.3.2.2.9.1.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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. This aging effect is managed by a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item. Further evaluation is documented in Section 3.3.2.2.9.2.
3.3.1-22	Steel with elastomer lining or stainless steel cladding piping, piping components, and piping elements exposed to treated water and treated borated water	Loss of material due to pitting and crevice corrosion (only for steel after lining/cladding degradation)	Water Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated	This line item is not applicable to PINGP. PINGP Spent Fuel Pool Cooling and Cleanup components do not have steel with elastomer lining or stainless steel cladding piping, piping components, and piping elements exposed to treated water and treated borated water. Further evaluation is documented in Section 3.3.2.2.10.1.
3.3.1-23	BWR Only				
3.3.1-24	Stainless steel and aluminum piping, piping components, and piping elements exposed to treated water	Loss of material due to pitting and crevice corrosion	Water Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated	This line item is not applicable to PWRs but is applicable to the Auxiliary Systems in BWRs. Further evaluation is documented in Section 3.3.2.2.10.2.
3.3.1-25	Copper alloy HVAC piping, piping components, piping elements exposed to condensation (external)	Loss of material due to pitting and crevice corrosion	A plant-specific aging management program is to be evaluated.	Yes, plant specific	This line item is not applicable to PINGP. PINGP excludes loss of material due to pitting and crevice corrosion since the surface is not exposed to a concentration of contaminants and not exposed to an aggressive environment in outdoor locations. Further evaluation is documented in Section 3.3.2.2.10.3.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. Further evaluation is documented in Section 3.3.2.2.10.4.
3.3.1-27	Stainless steel HVAC ducting and aluminum HVAC piping, piping components and piping elements exposed to condensation	Loss of material due to pitting and crevice corrosion	A plant-specific aging management program is to be evaluated.	Yes, plant specific	The plant-specific AMP used to manage loss of material due to pitting and crevice corrosion of stainless steel HVAC ducting and aluminum HVAC piping, piping components and piping elements exposed to condensation is the Compressed Air Monitoring Program. 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	The plant-specific AMP used to manage loss of material due to pitting and crevice corrosion of copper alloy piping, piping components, and piping elements exposed to condensation (internal) is the Compressed Air Monitoring Program. Further evaluation is documented in Section 3.3.2.2.10.6.
3.3.1-29	Stainless steel piping, piping components, and piping elements exposed to soil	Loss of material due to pitting and crevice corrosion	A plant-specific aging management program is to be evaluated.	Yes, plant specific	This line item is not applicable to PINGP. PINGP does not have stainless steel piping, piping components, and piping elements exposed to soil in NUREG-1801 Chapter VII systems. Further evaluation is documented in Section 3.3.2.2.10.7.
3.3.1-30	BWR Only				
3.3.1-31	BWR Only				

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-32	Stainless steel, aluminum and copper alloy piping, piping components, and piping elements exposed to fuel oil	Loss of material due to pitting, crevice, and microbiologically influenced corrosion	Fuel Oil Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated 3.3.2.2.12.1)	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Fuel Oil Chemistry Program implementation and Fire Protection Program implementation. This aging effect is managed with the Fuel Oil Chemistry Program, the One-Time Inspection Program and the Fire Protection Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item. 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. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and One-Time Inspection Program. 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	The plant-specific AMP used to manage loss of material due to wear of elastomer seals and components exposed to air - indoor uncontrolled (internal or external) is the External Surfaces Monitoring Program. Further evaluation is documented in Section 3.3.2.2.13.
3.3.1-35	Steel with stainless steel cladding pump casing exposed to treated borated water	Loss of material due to cladding breach	A plant-specific aging management program is to be evaluated. Reference NRC Information Notice 94-63, “Boric Acid Corrosion of Charging Pump Casings Caused by Cladding Cracks.	Yes, verify plant-specific program addresses cladding breach	This line item is not applicable to PINGP. The PINGP charging pumps are fabricated from stainless steel and not from carbon steel with stainless steel cladding. Further evaluation is documented in Section 3.3.2.2.14.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-36	BWR Only				
3.3.1-37	BWR Only				
3.3.1-38	BWR Only				
3.3.1-39	BWR Only				
3.3.1-40	Steel tanks in diesel fuel oil system exposed to air - outdoor (external)	Loss of material due to general, pitting, and crevice corrosion	Aboveground Steel Tanks	No	This line item was not used at PINGP. See line item 3.3.1-58 for further discussion.
3.3.1-41	High-strength steel closure bolting exposed to air with steam or water leakage	Cracking due to cyclic loading, stress corrosion cracking	Bolting Integrity	No	This line item is not applicable at PINGP. PINGP does not have high-strength steel closure bolting exposed to air with steam or water leakage in NUREG-1801 Chapter VII systems.
3.3.1-42	Steel closure bolting exposed to air with steam or water leakage	Loss of material due to general corrosion	Bolting Integrity	No	This line item was not used at PINGP. See line item 3.3.1-43 for further discussion.
3.3.1-43	Steel bolting and closure bolting exposed to air - indoor uncontrolled (external) or air - outdoor (External)	Loss of material due to general, pitting, and crevice corrosion	Bolting Integrity	No	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Bolting Integrity Program implementation. This aging effect is managed with the Bolting Integrity 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	This line item was not used at PINGP. See line item 3.3.1-43 for further discussion.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-45	Steel closure bolting exposed to air - indoor uncontrolled (external)	Loss of preload due to thermal effects, gasket creep, and self-loosening	Bolting Integrity	No	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Bolting Integrity Program implementation. This aging effect is managed with the Bolting Integrity Program.
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 with exception. Exceptions apply to NUREG-1801 recommendations for the Closed-Cycle Cooling Water System Program implementation. This aging effect is managed with the Closed-Cycle Cooling Water System 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 with exception. Exceptions apply to NUREG-1801 recommendations for the Closed-Cycle Cooling Water System Program implementation. This aging effect is managed with the Closed-Cycle Cooling Water System Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.
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 with exception. Exceptions apply to NUREG-1801 recommendations for the Closed-Cycle Cooling Water System Program implementation. This aging effect is managed with the Closed-Cycle Cooling Water System Program.
3.3.1-49	BWR Only				

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-50	Stainless steel piping, piping components, and piping elements exposed to closed cycle cooling water	Loss of material due to pitting and crevice corrosion	Closed-Cycle Cooling Water System	No	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Closed-Cycle Cooling Water System Program implementation. This aging effect is managed with the Closed-Cycle Cooling Water System Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.
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 with exception. Exceptions apply to NUREG-1801 recommendations for the Closed-Cycle Cooling Water System Program implementation. This aging effect is managed with the Closed-Cycle Cooling Water System Program.
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 with exception. Exceptions apply to NUREG-1801 recommendations for the Closed-Cycle Cooling Water System Program implementation. This aging effect is managed with the Closed-Cycle Cooling Water System 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 exception. Exceptions apply to NUREG-1801 recommendations for the Compressed Air Monitoring Program implementation. This aging effect is managed with the Compressed Air Monitoring Program and the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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 exception. Exceptions apply to NUREG-1801 recommendations for the Compressed Air Monitoring Program implementation. This aging effect is managed with the Compressed Air Monitoring Program.
3.3.1-55	Steel ducting closure bolting exposed to air - indoor uncontrolled (external)	Loss of material due to general corrosion	External Surfaces Monitoring	No	Consistent with NUREG-1801. This aging effect is managed with the External Surfaces Monitoring 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. This aging effect is managed with the External Surfaces Monitoring 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	Consistent with NUREG-1801. This aging effect is managed with the External Surfaces Monitoring Program.
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. This aging effect is managed with the External Surfaces Monitoring Program.
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	This line item was not used at PINGP. See line items 3.3.1-57 and 3.3.1-58 for further discussion. This aging effect is managed with the External Surfaces Monitoring 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. This aging effect is managed with the External Surfaces Monitoring Program.

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

Item Number	Component	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 exception. Exceptions apply to NUREG-1801 recommendations for the Fire Protection Program. This aging effect is managed with the Fire Protection Program or the External Surfaces Monitoring 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	This line item is not applicable at PINGP. PINGP does not have aluminum piping, piping components, and piping elements exposed to raw water in NUREG-1801 Chapter VII systems.
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 exception. Exceptions apply to NUREG-1801 recommendations for the Fire Protection Program implementation. The Fire Protection Program is credited with managing the aging effects loss of material and change in door clearance for fire rated doors, hardware, and door frames.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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 exception. Exceptions apply to NUREG-1801 recommendations for the Fire Protection Program implementation. Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Fuel Oil Chemistry Program implementation. Aging effect is managed by the Fire Protection Program and the Fuel Oil Chemistry Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.
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	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Fire Protection Program implementation. The Fire Protection Program and Structures Monitoring Program are credited with managing the aging effects cracking and spalling due to aggressive chemical attack, and reaction with aggregates for concrete fire barriers.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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 exception. Exceptions apply to NUREG-1801 recommendations for the Fire Protection Program implementation. The Fire Protection Program and Structures Monitoring Program are credited with managing the aging effects cracking and spalling due to freeze thaw, aggressive chemical attack, and reaction with aggregates for concrete fire barriers.
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	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Fire Protection Program implementation. The Fire Protection Program and Structures Monitoring Program are credited with managing the aging effect loss of material due to corrosion of embedded steel for concrete fire barriers.
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. This aging effect is managed with the Fire Water System Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.
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. Aging effect is managed by the Fire Water System Program.
3.3.1-70	Copper alloy piping, piping components, and piping elements exposed to raw water	Loss of material due to pitting, crevice, and microbiologically influenced corrosion, and fouling	Fire Water System	No	Consistent with NUREG-1801. Aging effect is managed by the Fire Water System Program.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-71	Steel piping, piping components, and piping elements exposed to moist air or condensation (Internal)	Loss of material due to general, pitting, and crevice corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components	No	Consistent with NUREG-1801. This aging effect is managed with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program.
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. This aging effect is managed with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components 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. The Inspection of Overhead Heavy Load and LIght Load (Related to Refueling) Handling Systems Program is credited with managing the aging effect loss of material due to general corrosion for structural girders and other miscellaneous structural steel members, welded, and bolted connections for heavy load and light load handling systems.
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	Consistent with NUREG-1801. The Inspection of Overhead Heavy Load and LIght Load (Related to Refueling) Handling Systems Program is credited with managing the aging effect loss of material due to wear for crane rails and other associated miscellaneous steel members, welded, and bolted connections for heavy load and the light load handling systems.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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	This line item is not applicable at PINGP. PINGP does not have elastomer seals and components exposed to a raw water environment in NUREG-1801 Chapter VII systems.
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. This aging effect is managed with the Open-Cycle Cooling Water System Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.
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. This aging effect is managed with the Open-Cycle Cooling Water System Program. In some cases, the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program or the Fire Water System Program is credited in lieu of the Open-Cycle Cooling Water System Program.
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	This line item was not used at PINGP. See line item 3.3.1-79 for further 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. This aging effect is managed with the Open-Cycle Cooling Water System Program.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
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. This aging effect is managed with the Open-Cycle Cooling Water System Program. In some cases, the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program is credited in lieu of the Open-Cycle Cooling Water System Program.
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. This aging effect is managed with the Open-Cycle Cooling Water System Program. In some cases, the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program is credited in lieu of the Open-Cycle Cooling Water System Program. PINGP applies loss of material due to fouling only to those components in a Mississippi River raw water environment (excludes well water).
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. This aging effect is managed with the Open-Cycle Cooling Water System Program. In some cases, the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program or the Fire Water System Program is credited in lieu of the Open-Cycle Cooling Water System Program.

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

Item Number	Component	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. This aging effect is managed with the Open-Cycle Cooling Water System Program. The Fire Water System Program is credited in lieu of the Open-Cycle Cooling Water System Program for the FP System.
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 exception. Exceptions apply to NUREG-1801 recommendations for the Selective Leaching of Materials Program implementation. This aging effect is managed with the Selective Leaching of Materials Program. PINGP does not differentiate between <15% Zn or >15% Zn for copper alloys. Therefore, all copper alloy piping, piping components, piping elements, and heat exchanger components exposed to raw water, treated water, or closed cycle cooling water are evaluated as susceptible to loss of material due to selective leaching.

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

Item Number	Component	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 exception. Exceptions apply to NUREG-1801 recommendations for the Selective Leaching of Materials Program implementation. This aging effect is managed with the Selective Leaching of Materials Program. PINGP does not differentiate between the various forms of cast iron. Therefore, all cast iron piping components, and piping elements exposed to soil, raw water, treated water, or closed-cycle cooling water are evaluated as susceptible to loss of material due to selective leaching.
3.3.1-86	Structural steel (new fuel storage rack assembly) exposed to air - indoor uncontrolled (external)	Loss of material due to general, pitting, and crevice corrosion	Structures Monitoring Program	No	This line item is not applicable to PINGP. The new fuel storage racks are made of stainless steel material rather than steel material. Stainless steel is not susceptible to loss of material in an air indoor and air with borated water leakage environments. Therefore aging management is not required.
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	This line item is not applicable to PINGP. The USAR states that Boraflex neutron-absorbing sheet material is not credited in the spent fuel pool criticality analysis. Therefore since this component does not perform any intended function, it is not in scope of License Renewal and requires no further review.

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

Item Number	Component	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. This aging effect is managed with the Boric Acid Corrosion Program. PINGP does not differentiate between <15% Zn or >15% Zn for copper alloy piping, piping components, and piping elements exposed to air with borated water leakage. Therefore, all copper alloy piping, piping components, and piping elements exposed to air with borated water leakage are evaluated as susceptible to loss of material due to boric acid wastage.
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. This aging effect is managed with the Boric Acid Corrosion Program.
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 exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed with the Water Chemistry Program.
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 exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed with the Water Chemistry Program.
3.3.1-92	Galvanized steel piping, piping components, and piping elements exposed to air - indoor uncontrolled	None	None	NA - No AEM or AMP	This line item is not applicable at PINGP. PINGP does not credit galvanized coatings and evaluates the base material as steel.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-93	Glass piping elements exposed to air, air - indoor uncontrolled (external), fuel oil, lubricating oil, raw water, treated water, and treated borated water	None	None	NA - No AEM or AMP	Consistent with NUREG-1801.
3.3.1-94	Stainless steel and nickel alloy piping, piping components, and piping elements exposed to air - indoor uncontrolled (external)	None	None	NA - No AEM or AMP	Consistent with NUREG-1801.
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	This line item was not used at PINGP. PINGP did not credit an air - indoor controlled (external) environment for the evaluation of steel piping, piping components, and piping elements but rather evaluated these components in an air - indoor uncontrolled (external) environment.
3.3.1-96	Steel and stainless steel piping, piping components, and piping elements in concrete	None	None	NA - No AEM or AMP	Further evaluation in Section 3.5.2.2.1.4 concluded that steel components in concrete are not susceptible to aging and do not require aging management. Based on the same rationale, steel and stainless steel piping, piping components, piping elements, and miscellaneous structural components in concrete are not susceptible to aging and do not require aging management.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-97	Steel, stainless steel, aluminum, and copper alloy piping, piping components, and piping elements exposed to gas	None	None	NA - No AEM or AMP	Consistent with NUREG-1801.
3.3.1-98	Steel, stainless steel, and copper alloy piping, piping components, and piping elements exposed to dried air	None	None	NA - No AEM or AMP	Consistent with NUREG-1801.
3.3.1-99	Stainless steel and copper alloy <15% Zn piping, piping components, and piping elements exposed to air with borated water leakage	None	None	NA - No AEM or AMP	This line item is not used at PINGP. See line item 3.3.1-94 for further discussion.

Table 3.3.2-1 Auxiliary Systems - Auxiliary and Radwaste Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F2-4	3.3.1-55	A
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
Damper / Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
Damper / Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F2-2	3.3.1-56	A
Damper / Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F2-3	3.3.1-72	A, 319
Ducting and Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
Ducting and Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F2-2	3.3.1-56	A
Ducting and Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F2-3	3.3.1-72	A, 319

Table 3.3.2-1 Auxiliary Systems - Auxiliary and Radwaste Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Ducting and Components	Pressure Boundary	Galvanized Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F2-2	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F2-3	3.3.1-72	A, 319
Fan Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F2-2	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F2-3	3.3.1-72	A, 319
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F2-2	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F2-3	3.3.1-72	A, 319
Flex Connections	Pressure Boundary	EPDM	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E

Table 3.3.2-1 Auxiliary Systems - Auxiliary and Radwaste Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Flex Connections	Pressure Boundary	EPDM	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
				Loss of Material - Wear	External Surfaces Monitoring Program	VII.F2-5	3.3.1-34	E
			Plant Indoor Air - Uncontrolled (Int)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
				Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
				Loss of Material - Wear	External Surfaces Monitoring Program	VII.F2-6	3.3.1-34	E

Table 3.3.2-1 Auxiliary Systems - Auxiliary and Radwaste Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F2-2	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F2-3	3.3.1-72	A, 319
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
Piping / Fittings	Pressure Boundary	Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VIII.I-2	3.4.1-41	A
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
Restricting Orifices	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VII.J-15	3.3.1-94	A
Sample Points	Pressure Boundary	Rubber	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
				Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E

Table 3.3.2-1 Auxiliary Systems - Auxiliary and Radwaste Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Sample Points	Pressure Boundary	Rubber	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
			Plant Indoor Air - Uncontrolled (Int)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
				Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.F2-7	3.3.1-11	E
Valve Bodies	Pressure Boundary	Bronze	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VIII.I-2	3.4.1-41	A

Table 3.3.2-1 Auxiliary Systems - Auxiliary and Radwaste Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F2-3	3.3.1-72	A, 319

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.E1-1	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.E1-1	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
			Primary Containment Air (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
Demineralizers	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	VII.E1-20	3.3.1-90	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	B

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	VII.E1-20	3.3.1-90	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	B
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.E1-1	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.E1-1	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 305
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 305
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 305, 310
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 305, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 305
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 305

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Steam (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 305
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 305
			Treated Water (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VIII.B1-10	3.4.1-01	C
				Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-6	3.3.1-48	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-6	3.3.1-48	B
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-6	3.3.1-48	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-6	3.3.1-48	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	C
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	C
			Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VII.E1-20	3.3.1-90	D, 305
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	D, 305
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	D, 305

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Stainless Steel	Treated Water (Ext)	Cracking - SCC/IGA	Closed-Cycle Cooling Water System Program	VII.C2-11	3.3.1-46	D
					One-Time Inspection Program	VII.E1-5, VII.E1-9	3.3.1-08, 3.3.1-07	E, 321
					Water Chemistry Program	VII.E1-5, VII.E1-9	3.3.1-08, 3.3.1-07	B, 321
				Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
					Water Chemistry Program	VII.E1-17	3.3.1-91	D
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
					Water Chemistry Program	VII.E1-17	3.3.1-91	D
			Treated Water (Int)	Cracking - SCC/IGA	Closed-Cycle Cooling Water System Program	VII.C2-11	3.3.1-46	D
					One-Time Inspection Program	VII.E1-5, VII.E1-9	3.3.1-08, 3.3.1-07	E, 321
					Water Chemistry Program	VII.E1-5, VII.E1-9	3.3.1-08, 3.3.1-07	B, 321
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VII.E1-4	3.3.1-02	A
				Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
					Water Chemistry Program	VII.E1-17	3.3.1-91	D
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
					Water Chemistry Program	VII.E1-17	3.3.1-91	D

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Stainless Steel	Steam (Ext)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.F-3	3.4.1-14	A, 305
					Water Chemistry Program	VIII.F-3	3.4.1-14	B, 305
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	C, 305
					Water Chemistry Program	VIII.C-1	3.4.1-16	D, 305
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	C, 305
					Water Chemistry Program	VIII.C-1	3.4.1-16	D, 305
			Treated Water (Ext)	Cracking - SCC/IGA	Closed-Cycle Cooling Water System Program	VII.C2-11	3.3.1-46	D
				Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
			Treated Water (Int)	Cracking - SCC/IGA	Closed-Cycle Cooling Water System Program	VII.C2-11	3.3.1-46	D
					One-Time Inspection Program	VII.E1-5, VII.E1-9	3.3.1-08, 3.3.1-07	E, 321
					Water Chemistry Program	VII.E1-5, VII.E1-9	3.3.1-08, 3.3.1-07	B, 321
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VII.E1-4	3.3.1-02	A
				Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
					Water Chemistry Program	VII.E1-17	3.3.1-91	D

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
					Water Chemistry Program	VII.E1-17	3.3.1-91	D
Manifolds	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.E1-1	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.E1-1	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 310
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	VII.E1-20	3.3.1-90	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	B
Piping / Fittings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.E1-1	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.E1-1	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 310
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 310

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
		Copper Alloy	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.E1-12	3.3.1-26	A
					One-Time Inspection Program	VII.E1-12	3.3.1-26	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.E1-12	3.3.1-26	A
					One-Time Inspection Program	VII.E1-12	3.3.1-26	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.E1-1	3.3.1-89	A
		Stainless Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.E1-15	3.3.1-33	A
					One-Time Inspection Program	VII.E1-15	3.3.1-33	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.E1-15	3.3.1-33	A
					One-Time Inspection Program	VII.E1-15	3.3.1-33	A
			Nitrogen Gas (Int)	None	None	VII.J-19	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2, IV.C2-1	3.1.1-68, 3.1.1-70	A
					One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program	IV.C2-1	3.1.1-70	A
					One-Time Inspection Program	VIII.E-30	3.4.1-14	A

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	IV.C2-2, IV.C2-1, VII.E1-20, VIII.E-30	3.1.1-68, 3.1.1-70, 3.3.1-90, 3.4.1-14	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VII.E1-16	3.3.1-02	A
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VII.E1-17, VIII.E-29	3.3.1-91, 3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VII.E1-17, VIII.E-29	3.3.1-91, 3.4.1-16	B
Pump Casings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.E1-19	3.3.1-14	A
					One-Time Inspection Program	VII.E1-19	3.3.1-14	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.E1-19	3.3.1-14	A, 310
					One-Time Inspection Program	VII.E1-19	3.3.1-14	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.E1-19	3.3.1-14	A
					One-Time Inspection Program	VII.E1-19	3.3.1-14	A

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.E1-19	3.3.1-14	A
					One-Time Inspection Program	VII.E1-19	3.3.1-14	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 310
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
		Cast Austenitic Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	VII.E1-20	3.3.1-90	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	B

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Cast Iron	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.E1-19	3.3.1-14	A
					One-Time Inspection Program	VII.E1-19	3.3.1-14	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.E1-19	3.3.1-14	A, 310
					One-Time Inspection Program	VII.E1-19	3.3.1-14	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.E1-19	3.3.1-14	A
					One-Time Inspection Program	VII.E1-19	3.3.1-14	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.E1-19	3.3.1-14	A
					One-Time Inspection Program	VII.E1-19	3.3.1-14	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.E1-1	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Cast Iron	Treated Water (Int)	Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.E1-14	3.3.1-85	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VII.E1-7, VIII.E-30	3.3.1-09, 3.4.1-14	E
					Water Chemistry Program	VII.E1-7, VIII.E-30	3.3.1-09, 3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VII.E1-17, VIII.E-29	3.3.1-91, 3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VII.E1-17, VIII.E-29	3.3.1-91, 3.4.1-16	B

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Restricting Orifices	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.E1-1	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 310
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	VII.E1-20	3.3.1-90	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	B

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Rupture Discs	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	VII.E1-20	3.3.1-90	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	B
Sight Glasses	Pressure Boundary	Glass	Lubricating Oil (Int)	None	None	VII.J-10	3.3.1-93	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-8	3.3.1-93	A
			Treated Water (Int)	None	None	VII.J-13	3.3.1-93	A
Tanks	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.E1-19	3.3.1-14	C
					One-Time Inspection Program	VII.E1-19	3.3.1-14	C
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.E1-19	3.3.1-14	C, 310
					One-Time Inspection Program	VII.E1-19	3.3.1-14	C, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.E1-19	3.3.1-14	C
					One-Time Inspection Program	VII.E1-19	3.3.1-14	C

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.E1-19	3.3.1-14	C
					One-Time Inspection Program	VII.E1-19	3.3.1-14	C
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A
					Water Chemistry Program	VIII.E-40	3.4.1-06	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A, 310
					Water Chemistry Program	VIII.E-40	3.4.1-06	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A
					Water Chemistry Program	VIII.E-40	3.4.1-06	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A
					Water Chemistry Program	VIII.E-40	3.4.1-06	B
		Carbon Steel w/ Stainless Steel Clad	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.E1-1	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	VII.E1-20	3.3.1-90	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	B

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel w/ Stainless Steel Clad	Treated Water (Int)	Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	B
		Cast Austenitic Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	C
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	VII.E1-20	3.3.1-90	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	D
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	D
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	VII.E1-20	3.3.1-90	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	D
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	D
			Wet Air/Gas (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.E-38	3.4.1-14	A
					Water Chemistry Program	VIII.E-38	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	C
					Water Chemistry Program	VIII.E-29	3.4.1-16	D
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	C
					Water Chemistry Program	VIII.E-29	3.4.1-16	D

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.E1-1	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.E1-1	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 310
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Stainless Steel	Treated Water (Int)	Cracking - SCC/IGA	Water Chemistry Program	VII.E1-20	3.3.1-90	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.E1-17	3.3.1-91	B
Valve Bodies	Pressure Boundary	Brass	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.E1-12	3.3.1-26	A
					One-Time Inspection Program	VII.E1-12	3.3.1-26	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.E1-12	3.3.1-26	A
					One-Time Inspection Program	VII.E1-12	3.3.1-26	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
		Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.E1-1	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 310
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
		Cast Austenitic Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.E-30	3.4.1-14	A
					Water Chemistry Program	VII.E1-20, VIII.E-30	3.3.1-90, 3.4.1-14	B

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Cast Austenitic Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VII.E1-17, VIII.E-29	3.3.1-91, 3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VII.E1-17, VIII.E-29	3.3.1-91, 3.4.1-16	B
		Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.E1-1	3.3.1-89	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-15	3.4.1-15	A
					Water Chemistry Program	VIII.F-15	3.4.1-15	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-15	3.4.1-15	A
					Water Chemistry Program	VIII.F-15	3.4.1-15	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.E1-3	3.3.1-84	B
		Stainless Steel	Nitrogen Gas (Int)	None	None	VII.J-19	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-2 Auxiliary Systems - Chemical and Volume Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Treated Water (Int)	Cracking - SCC/IGA	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program	IV.C2-2	3.1.1-68	A
					One-Time Inspection Program	VIII.E-30	3.4.1-14	A
					Water Chemistry Program	IV.C2-2, VII.E1-20, VIII.E-30	3.1.1-68, 3.3.1-90, 3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VII.E1-17, VIII.E-29	3.3.1-91, 3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VII.E1-17, VIII.E-29	3.3.1-91, 3.4.1-16	B

Table 3.3.2-3 Auxiliary Systems- Component Cooling System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
Flex Connections	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
Flow Elements	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-3 Auxiliary Systems- Component Cooling System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Flow Elements	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
			Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B

Table 3.3.2-3 Auxiliary Systems- Component Cooling System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Treated Water (Ext)	Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
Heat Exchanger Tubes	Heat Transfer	Stainless Steel	Raw Water (Int)	Heat Transfer Degradation - Fouling	Open-Cycle Cooling Water System Program	VII.C1-7	3.3.1-83	A
			Treated Water (Ext)	Heat Transfer Degradation - Fouling	Closed-Cycle Cooling Water System Program	VII.C2-3	3.3.1-52	B
	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
			Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B

Table 3.3.2-3 Auxiliary Systems- Component Cooling System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
Piping / Fittings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B

Table 3.3.2-3 Auxiliary Systems- Component Cooling System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Primary Containment Air (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-4	3.3.1-51	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-4	3.3.1-51	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-6	3.3.1-84	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
Pump Casings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

Table 3.3.2-3 Auxiliary Systems- Component Cooling System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
Restricting Orifices	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
Sight Glasses	Pressure Boundary	Glass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-8	3.3.1-93	A
			Treated Water (Int)	None	None	VII.J-13	3.3.1-93	A
Tanks	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 310

Table 3.3.2-3 Auxiliary Systems- Component Cooling System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
Thermowells	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
Valve Bodies	Pressure Boundary	Brass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-4	3.3.1-51	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-4	3.3.1-51	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-6	3.3.1-84	B

Table 3.3.2-3 Auxiliary Systems- Component Cooling System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Bronze	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-4	3.3.1-51	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-4	3.3.1-51	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-6	3.3.1-84	B
		Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B

Table 3.3.2-3 Auxiliary Systems- Component Cooling System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-9	3.3.1-85	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B

Table 3.3.2-4 Auxiliary Systems - Containment Hydrogen Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	C
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program			H, 304
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
			Primary Containment Air (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
Manifolds	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-4 Auxiliary Systems - Containment Hydrogen Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.G-23	3.3.1-71	A, 319
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
					Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.G-23	3.3.1-71	A, 319
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
Restricting Orifices	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
Valve Bodies	Pressure Boundary	Brass	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VIII.I-2	3.4.1-41	A

Table 3.3.2-4 Auxiliary Systems - Containment Hydrogen Control System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Bronze	Dry/Filtered Instrument Air (Int)	None	None	VII.J-3	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
		Carbon Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-22	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
		Stainless Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-18	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Int)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Air Regulators	Pressure Boundary	Aluminum	Dry/Filtered Instrument Air (Int)	None	None	VII.J-2	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-2	3.2.1-50	A
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
					External Surfaces Monitoring Program	VII.F1-4	3.3.1-55	A
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
Chillers Components	Pressure Boundary	Carbon Steel	Freon Gas (Ext)	None	None	VII.J-23	3.3.1-97	A
			Freon Gas (Int)	None	None	VII.J-23	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F1-2	3.3.1-56	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Erosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Chillers Components	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-11	3.3.1-48	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-11	3.3.1-48	B
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-11	3.3.1-48	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-11	3.3.1-48	B
Damper / Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F1-2	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F1-3	3.3.1-72	A
Ducting and Components	Pressure Boundary	Galvanized Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F1-2	3.3.1-56	A

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Ducting and Components	Pressure Boundary	Galvanized Steel	Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F1-3	3.3.1-72	A, 319
Fan Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F1-2	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F1-3	3.3.1-72	A
Filter / Strainer Elements	Filter	Carbon Steel	Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
					One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B, 310
					One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 310
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
					One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Elements	Filter	Carbon Steel	Treated Water (Ext)	Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
					One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F1-2	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F1-3	3.3.1-72	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
Flex Connections	Pressure Boundary	EPDM	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F1-7	3.3.1-11	E
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F1-7	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F1-7	3.3.1-11	E

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Flex Connections	Pressure Boundary	EPDM	Plant Indoor Air - Uncontrolled (Ext)	Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F1-7	3.3.1-11	E
				Loss of Material - Wear	External Surfaces Monitoring Program	VII.F1-5	3.3.1-34	E
			Plant Indoor Air - Uncontrolled (Int)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F1-7	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F1-7	3.3.1-11	E
				Loss of Material - Wear	External Surfaces Monitoring Program	VII.F1-6	3.3.1-34	E
		PVC	Dry/Filtered Instrument Air (Int)	None	None			F, 313
			Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program			F
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program			F
				Cracking - Ozone Exposure	External Surfaces Monitoring Program			F
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program			F
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Flex Connections	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
Heat Exchanger Tubes	Heat Transfer	Copper Alloy	Freon Gas (Ext)	None	None	VII.J-4	3.3.1-97	C
			Plant Indoor Air - Uncontrolled (Ext)	Heat Transfer Degradation - Fouling	External Surfaces Monitoring Program			H
			Raw Water (Int)	Heat Transfer Degradation - Fouling	Open-Cycle Cooling Water System Program	VII.C1-6	3.3.1-83	A
			Treated Water (Int)	Heat Transfer Degradation - Fouling	Closed-Cycle Cooling Water System Program	VII.F1-12	3.3.1-52	B
	Pressure Boundary	Aluminum	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-2	3.2.1-50	C
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-15	3.4.1-15	E
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-15	3.4.1-15	E
		Copper Alloy	Freon Gas (Ext)	None	None	VII.J-4	3.3.1-97	C
			Freon Gas (Int)	None	None	VII.J-4	3.3.1-97	C

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	C
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-4	3.3.1-84	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-8	3.3.1-51	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-8	3.3.1-51	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.F1-9	3.3.1-84	B
Humidifiers	Pressure Boundary	Aluminum	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-2	3.2.1-50	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-15	3.4.1-15	A
					Water Chemistry Program	VIII.E-15	3.4.1-15	B

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Humidifiers	Pressure Boundary	Aluminum	Treated Water (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-15	3.4.1-15	A
					Water Chemistry Program	VIII.E-15	3.4.1-15	B
		Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F1-2	3.3.1-56	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
Manifolds	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F1-2	3.3.1-56	A

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F1-3	3.3.1-72	A
		Stainless Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-18	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
Piping / Fittings	Pressure Boundary	Bronze	Dry/Filtered Instrument Air (Int)	None	None	VII.J-3	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-3	3.2.1-53	A
		Carbon Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-22	3.3.1-98	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.F1-19	3.3.1-14	A
					One-Time Inspection Program	VII.F1-19	3.3.1-14	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.F1-19	3.3.1-14	A, 310
					One-Time Inspection Program	VII.F1-19	3.3.1-14	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.F1-19	3.3.1-14	A
					One-Time Inspection Program	VII.F1-19	3.3.1-14	A

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.F1-19	3.3.1-14	A
					One-Time Inspection Program	VII.F1-19	3.3.1-14	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F1-2	3.3.1-56	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
		Copper Alloy	Freon Gas (Int)	None	None	VII.J-4	3.3.1-97	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-10	3.3.1-26	A
					One-Time Inspection Program	VII.H2-10	3.3.1-26	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-10	3.3.1-26	A
					One-Time Inspection Program	VII.H2-10	3.3.1-26	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VIII.I-2	3.4.1-41	A
		Stainless Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-18	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
Pump Casings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.F1-19	3.3.1-14	A
					One-Time Inspection Program	VII.F1-19	3.3.1-14	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.F1-19	3.3.1-14	A, 310
					One-Time Inspection Program	VII.F1-19	3.3.1-14	A, 310

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.F1-19	3.3.1-14	A
					One-Time Inspection Program	VII.F1-19	3.3.1-14	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.F1-19	3.3.1-14	A
					One-Time Inspection Program	VII.F1-19	3.3.1-14	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F1-2	3.3.1-56	A
		Cast Iron	Freon Gas (Int)	None	None	VII.J-23	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F1-2	3.3.1-56	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.F1-18	3.3.1-85	B

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Rupture Discs	Pressure Boundary	Stainless Steel	Freon Gas (Int)	None	None	VII.J-19	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
Sample Points	Pressure Boundary	Rubber	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F1-7	3.3.1-11	E
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F1-7	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F1-7	3.3.1-11	E
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F1-7	3.3.1-11	E
			Plant Indoor Air - Uncontrolled (Int)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F1-7	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F1-7	3.3.1-11	E
Tanks	Pressure Boundary	Carbon Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-22	3.3.1-98	C
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B, 310

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
		Copper Alloy	Freon Gas (Int)	None	None	VII.J-4	3.3.1-97	C
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	C
Thermowells	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F1-2	3.3.1-56	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
Valve Bodies	Pressure Boundary	Brass	Dry/Filtered Instrument Air (Int)	None	None	VII.J-3	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-15	3.3.1-51	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-15	3.3.1-51	B

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Brass	Treated Water (Int)	Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.F1-9	3.3.1-84	D
		Bronze	Dry/Filtered Instrument Air (Int)	None	None	VII.J-3	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-15	3.3.1-51	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-15	3.3.1-51	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.F1-9	3.3.1-84	D
		Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F1-2	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F1-3	3.3.1-72	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
					One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B, 310

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 310
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
					One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-20	3.3.1-47	B
					One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
		Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-15	3.3.1-51	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.F1-15	3.3.1-51	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.F1-9	3.3.1-84	D
		Stainless Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-18	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-5 Auxiliary Systems - Control Room and Miscellaneous Area Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Buried (Ext)	Loss of Material - Crevice Corrosion	Bolting Integrity Program			G, 306
				Loss of Material - Galvanic Corrosion	Bolting Integrity Program			G, 306
				Loss of Material - General Corrosion	Bolting Integrity Program			G, 306
				Loss of Material - MIC	Bolting Integrity Program			G, 306
				Loss of Material - Pitting Corrosion	Bolting Integrity Program			G, 306
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program			G, 306, 304
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
			Primary Containment Air (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
Chillers Components	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-5	3.3.1-21	A
					One-Time Inspection Program	VII.H2-5	3.3.1-21	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.H2-5	3.3.1-21	A, 310
					One-Time Inspection Program	VII.H2-5	3.3.1-21	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.H2-5	3.3.1-21	A
					One-Time Inspection Program	VII.H2-5	3.3.1-21	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-5	3.3.1-21	A
					One-Time Inspection Program	VII.H2-5	3.3.1-21	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Chillers Components	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
Filter / Strainer Elements	Filter	Stainless Steel	Raw Water (Ext)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 310
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
		Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 310
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-11	3.3.1-85	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
Flex Connections	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
Heat Exchanger Components	Pressure Boundary	Copper Alloy	Primary Containment Air (Ext)	None	None	VIII.I-2	3.4.1-41	C
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Copper Alloy	Raw Water (Int)	Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-4	3.3.1-84	B
Heat Exchanger Tubes	Heat Transfer	Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	Heat Transfer Degradation - Fouling	External Surfaces Monitoring Program			H
			Raw Water (Int)	Heat Transfer Degradation - Fouling	Open-Cycle Cooling Water System Program	VII.C1-6	3.3.1-83	A
	Pressure Boundary	Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	C
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Primary Containment Air (Ext)	None	None	VIII.I-2	3.4.1-41	C
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Copper Alloy	Raw Water (Int)	Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-4	3.3.1-84	B
Manifolds	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 310
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
Piping / Fittings	Pressure Boundary	Brass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Ext)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-10	3.3.1-84	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Brass	Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-10	3.3.1-84	B
		Carbon Steel	Buried (Ext)	Loss of Material - Crevice Corrosion	Buried Piping and Tanks Inspection Program	VII.C1-18	3.3.1-19	A, 306
				Loss of Material - Galvanic Corrosion	Buried Piping and Tanks Inspection Program	VII.C1-18	3.3.1-19	A, 306, 310
				Loss of Material - General Corrosion	Buried Piping and Tanks Inspection Program	VII.C1-18	3.3.1-19	A, 306
				Loss of Material - MIC	Buried Piping and Tanks Inspection Program	VII.C1-18	3.3.1-19	A, 306
				Loss of Material - Pitting Corrosion	Buried Piping and Tanks Inspection Program	VII.C1-18	3.3.1-19	A, 306
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.C1-17	3.3.1-14	A
					One-Time Inspection Program	VII.C1-17	3.3.1-14	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.C1-17	3.3.1-14	A, 310
					One-Time Inspection Program	VII.C1-17	3.3.1-14	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.C1-17	3.3.1-14	A
					One-Time Inspection Program	VII.C1-17	3.3.1-14	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.C1-17	3.3.1-14	A
					One-Time Inspection Program	VII.C1-17	3.3.1-14	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.G-23	3.3.1-71	A, 319
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.G-23	3.3.1-71	A, 319
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.G-23	3.3.1-71	A, 319

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
					Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Erosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310
					Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 310
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
					Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
					Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
					Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
		Copper Alloy	Freon Gas (Int)	None	None	VII.J-4	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Primary Containment Air (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Raw Water (Ext)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Copper Alloy	Raw Water (Ext)	Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-10	3.3.1-84	B
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-10	3.3.1-84	B
		PVDF	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program			F
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program			F
				Cracking - Ozone Exposure	External Surfaces Monitoring Program			F
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program			F
			Raw Water (Int)	None	None			F, 313

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
Pump Casings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Ext)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 310
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Carbon Steel	Raw Water (Ext)	Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 310
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
		Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Ext)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 310
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Cast Iron	Raw Water (Ext)	Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-11	3.3.1-85	B
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 310
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-11	3.3.1-85	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
Restricting Orifices	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 310
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - Erosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Restricting Orifices	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
	Throttle	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 310
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Restricting Orifices	Throttle	Stainless Steel	Raw Water (Int)	Loss of Material - Erosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
Sight Glasses	Pressure Boundary	Glass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-11	3.3.1-93	A
			Raw Water (Int)	None	None	VII.J-8	3.3.1-93	A
Spray Nozzles	Spray	Stainless Steel	Raw Water (Ext)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - Erosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Spray Nozzles	Spray	Stainless Steel	Raw Water (Int)	Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
Tanks	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	C
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	C, 310
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	C
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	C
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	C
Thermowells	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 310
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
Valve Bodies	Pressure Boundary	Brass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Brass	Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-10	3.3.1-84	B
		Bronze	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-10	3.3.1-84	B
		Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 310
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
		Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 310

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Cast Iron	Raw Water (Int)	Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-11	3.3.1-85	B
		PVC	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program			F
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program			F
				Cracking - Ozone Exposure	External Surfaces Monitoring Program			F
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program			F
			Raw Water (Int)	None	None			F, 313
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A

Table 3.3.2-7 Auxiliary Systems - Diesel Generator and Screenhouse Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F4-3	3.3.1-55	A
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
Damper / Housings	Pressure Boundary	Carbon Steel	Outdoor Air - Sheltered (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F4-1	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F4-1	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F4-2	3.3.1-72	A, 319
		Galvanized Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F4-1	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F4-2	3.3.1-72	A, 319
Ducting and Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F4-1	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F4-2	3.3.1-72	A, 319

Table 3.3.2-7 Auxiliary Systems - Diesel Generator and Screenhouse Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Ducting and Components	Pressure Boundary	Galvanized Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F4-1	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F4-2	3.3.1-72	A, 319
Fan Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F4-1	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F4-2	3.3.1-72	A, 319
Flex Connections	Pressure Boundary	EPDM	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Loss of Material - Wear	External Surfaces Monitoring Program	VII.F4-4	3.3.1-34	E

Table 3.3.2-7 Auxiliary Systems - Diesel Generator and Screenhouse Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Flex Connections	Pressure Boundary	EPDM	Plant Indoor Air - Uncontrolled (Int)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Loss of Material - Wear	External Surfaces Monitoring Program	VII.F4-5	3.3.1-34	E
Manifolds	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F4-1	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F4-2	3.3.1-72	A, 319
Piping / Fittings	Pressure Boundary	Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
		Galvanized Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F4-1	3.3.1-56	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E

Table 3.3.2-7 Auxiliary Systems - Diesel Generator and Screenhouse Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Galvanized Steel	Raw Water (Int)	Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
Tanks	Pressure Boundary	ABS	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program			F
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program			F
				Cracking - Ozone Exposure	External Surfaces Monitoring Program			F
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program			F
			Raw Water (Int)	None	None			F, 313

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Air Regulators	Pressure Boundary	Aluminum	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-2	3.2.1-50	A
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
Filter / Strainer Elements	Filter	Carbon Steel	Lubricating Oil (Ext)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A, 310
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Elements	Filter	Carbon Steel	Lubricating Oil (Ext)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
Filter/Strainer Housing	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	B
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A
				Loss of Material - Galvanic Corrosion	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	B, 310
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A, 310
				Loss of Material - General Corrosion	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	B
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	B
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	B
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A, 310
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VII.H2-20	3.3.1-14	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
				Loss of Material - General Corrosion	One-Time Inspection Program	VII.H2-20	3.3.1-14	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VII.H2-20	3.3.1-14	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VII.J-15	3.3.1-94	A
Flex Connections	Pressure Boundary	Natural Rubber	Fuel Oil (Int)	None	None			G, 313
			Lubricating Oil (Int)	None	None			G, 313
			Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
			Plant Indoor Air - Uncontrolled (Int)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Flex Connections	Pressure Boundary	Natural Rubber	Treated Water (Int)	Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program			H, 323
				Cracking - Thermal Exposure	External Surfaces Monitoring Program			H, 323
		Stainless Steel	Diesel Exhaust (Int)	Cracking - Stress Corrosion Cracking (SCC)	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-1	3.3.1-06	E
				Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-2	3.3.1-18	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-2	3.3.1-18	E
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-5	3.3.1-21	A
					One-Time Inspection Program	VII.H2-5	3.3.1-21	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.H2-5	3.3.1-21	A, 310
					One-Time Inspection Program	VII.H2-5	3.3.1-21	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.H2-5	3.3.1-21	A
					One-Time Inspection Program	VII.H2-5	3.3.1-21	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-5	3.3.1-21	A
					One-Time Inspection Program	VII.H2-5	3.3.1-21	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-5	3.3.1-21	A
					One-Time Inspection Program	VII.H2-5	3.3.1-21	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.H2-5	3.3.1-21	A, 310
					One-Time Inspection Program	VII.H2-5	3.3.1-21	A, 310

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.H2-5	3.3.1-21	A
					One-Time Inspection Program	VII.H2-5	3.3.1-21	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-5	3.3.1-21	A
					One-Time Inspection Program	VII.H2-5	3.3.1-21	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	C, 319
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	C, 319
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	C, 319
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
		Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Cast Iron	Raw Water (Int)	Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.H2-14	3.3.1-85	D
		Copper Alloy	Lubricating Oil (Ext)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-10	3.3.1-26	C
					One-Time Inspection Program	VII.H2-10	3.3.1-26	C
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-10	3.3.1-26	C
					One-Time Inspection Program	VII.H2-10	3.3.1-26	C
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-4	3.3.1-84	B

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Copper Alloy	Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-8	3.3.1-51	D
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-8	3.3.1-51	D
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.F1-9	3.3.1-84	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-8	3.3.1-51	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-8	3.3.1-51	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.F1-9	3.3.1-84	B
		Stainless Steel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
			Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Heat Transfer	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Heat Transfer Degradation - Fouling	External Surfaces Monitoring Program			H
			Treated Water (Int)	Heat Transfer Degradation - Fouling	Closed-Cycle Cooling Water System Program	VII.F4-9	3.3.1-52	B
		Copper Alloy	Hydraulic Oil (Ext)	Heat Transfer Degradation - Fouling	Lubricating Oil Analysis Program	VIII.G-8	3.4.1-10	A
				Heat Transfer Degradation - Fouling	One-Time Inspection Program	VIII.G-8	3.4.1-10	A
			Lubricating Oil (Ext)	Heat Transfer Degradation - Fouling	Lubricating Oil Analysis Program	VIII.G-8	3.4.1-10	A
				Heat Transfer Degradation - Fouling	One-Time Inspection Program	VIII.G-8	3.4.1-10	A
			Plant Indoor Air - Uncontrolled (Ext)	Heat Transfer Degradation - Fouling	External Surfaces Monitoring Program			H
			Raw Water (Int)	Heat Transfer Degradation - Fouling	Open-Cycle Cooling Water System Program	VII.C1-6	3.3.1-83	A
			Treated Water (Ext)	Heat Transfer Degradation - Fouling	Closed-Cycle Cooling Water System Program	VII.C2-2	3.3.1-52	B
			Treated Water (Int)	Heat Transfer Degradation - Fouling	Closed-Cycle Cooling Water System Program	VII.C2-2	3.3.1-52	B

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Heat Transfer	Stainless Steel	Treated Water (Ext)	Heat Transfer Degradation - Fouling	Closed-Cycle Cooling Water System Program	VII.C2-3	3.3.1-52	B
			Raw Water (Int)	Heat Transfer Degradation - Fouling	Open-Cycle Cooling Water System Program	VII.H2-6	3.3.1-83	A
	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
		Copper Alloy	Hydraulic Oil (Ext)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-10	3.3.1-26	C
					One-Time Inspection Program	VII.H2-10	3.3.1-26	C
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-10	3.3.1-26	C
					One-Time Inspection Program	VII.H2-10	3.3.1-26	C
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Copper Alloy	Lubricating Oil (Ext)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-10	3.3.1-26	C
					One-Time Inspection Program	VII.H2-10	3.3.1-26	C
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-10	3.3.1-26	C
					One-Time Inspection Program	VII.H2-10	3.3.1-26	C
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-4	3.3.1-84	B
			Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-2	3.3.1-51	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-2	3.3.1-51	B

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Copper Alloy	Treated Water (Ext)	Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.F1-9	3.3.1-84	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-2	3.3.1-51	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-2	3.3.1-51	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.F1-9	3.3.1-84	B
		Stainless Steel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
			Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
Heaters	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heaters	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A, 310
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
		Copper Alloy	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-10	3.3.1-26	A
					One-Time Inspection Program	VII.H2-10	3.3.1-26	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heaters	Pressure Boundary	Copper Alloy	Lubricating Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-10	3.3.1-26	A
					One-Time Inspection Program	VII.H2-10	3.3.1-26	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
Level Gages	Pressure Boundary	Glass	Fuel Oil (Int)	None	None	VII.J-9	3.3.1-93	A
			Lubricating Oil (Int)	None	None	VII.J-10	3.3.1-93	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-8	3.3.1-93	A
Manifolds	Pressure Boundary	Stainless Steel	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H2-16	3.3.1-32	B
					One-Time Inspection Program	VII.H2-16	3.3.1-32	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H2-16	3.3.1-32	B
					One-Time Inspection Program	VII.H2-16	3.3.1-32	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H2-16	3.3.1-32	B
					One-Time Inspection Program	VII.H2-16	3.3.1-32	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-17	3.3.1-33	A
					One-Time Inspection Program	VII.H2-17	3.3.1-33	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Stainless Steel	Lubricating Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-17	3.3.1-33	A
					One-Time Inspection Program	VII.H2-17	3.3.1-33	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
Mufflers	Pressure Boundary	Carbon Steel	Diesel Exhaust (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-2	3.3.1-18	E
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-2	3.3.1-18	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-2	3.3.1-18	E
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Oil Pans	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A, 310
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
Piping / Fittings	Pressure Boundary	Carbon Steel	Diesel Exhaust (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VII.E1-18	3.3.1-02	A
				Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-2	3.3.1-18	E
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-2	3.3.1-18	E

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Diesel Exhaust (Int)	Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-2	3.3.1-18	E
			Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.G-21	3.3.1-64	B
						VII.H2-24	3.3.1-20	B
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A
				Loss of Material - Galvanic Corrosion	Fuel Oil Chemistry Program	VII.G-21	3.3.1-64	B, 310
						VII.H2-24	3.3.1-20	B, 310
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A, 310
				Loss of Material - General Corrosion	Fuel Oil Chemistry Program	VII.G-21	3.3.1-64	B
						VII.H2-24	3.3.1-20	B
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.G-21	3.3.1-64	B
						VII.H2-24	3.3.1-20	B
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.G-21	3.3.1-64	B
						VII.H2-24	3.3.1-20	B
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A, 310
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
			Outdoor Air - Not Sheltered (Ext)	Loss of Material - Crevice Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A, 301
				Loss of Material - Galvanic Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A, 301
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A
				Loss of Material - Pitting Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A, 301
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 310
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B, 310

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
		Copper Alloy	Fuel Oil (Int)	Cracking - SCC/IGA	Fuel Oil Chemistry Program			H
					One-Time Inspection Program			H
				Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H2-9	3.3.1-32	B
					One-Time Inspection Program	VII.H2-9	3.3.1-32	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H2-9	3.3.1-32	B
					One-Time Inspection Program	VII.H2-9	3.3.1-32	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H2-9	3.3.1-32	B
					One-Time Inspection Program	VII.H2-9	3.3.1-32	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
		Stainless Steel	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H2-16	3.3.1-32	B
					One-Time Inspection Program	VII.H2-16	3.3.1-32	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Fuel Oil (Int)	Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H2-16	3.3.1-32	B
					One-Time Inspection Program	VII.H2-16	3.3.1-32	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H2-16	3.3.1-32	B
					One-Time Inspection Program	VII.H2-16	3.3.1-32	A
			Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-17	3.3.1-33	A
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VII.H2-17	3.3.1-33	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-17	3.3.1-33	A
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VII.H2-17	3.3.1-33	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-17	3.3.1-33	A
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VII.H2-17	3.3.1-33	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-17	3.3.1-33	A
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VII.H2-17	3.3.1-33	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
Pump Casings	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	B
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A
				Loss of Material - Galvanic Corrosion	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	B, 310
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A, 310
				Loss of Material - General Corrosion	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	B
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	B
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	B
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A, 310
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
Sight Glasses	Pressure Boundary	Glass	Fuel Oil (Int)	None	None	VII.J-9	3.3.1-93	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-8	3.3.1-93	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Silencers	Pressure Boundary	Carbon Steel	Diesel Exhaust (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-2	3.3.1-18	E
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-2	3.3.1-18	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-2	3.3.1-18	E
			Outdoor Air - Not Sheltered (Ext)	Loss of Material - Crevice Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A, 301
				Loss of Material - Galvanic Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A, 301
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A
				Loss of Material - Pitting Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A, 301
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Silencers	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Int)	Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319
Tanks	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	D
					One-Time Inspection Program	VII.H2-24	3.3.1-20	C
				Loss of Material - Galvanic Corrosion	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	D, 310
					One-Time Inspection Program	VII.H2-24	3.3.1-20	C, 310
				Loss of Material - General Corrosion	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	D
					One-Time Inspection Program	VII.H2-24	3.3.1-20	C
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	D
					One-Time Inspection Program	VII.H2-24	3.3.1-20	C
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	D
					One-Time Inspection Program	VII.H2-24	3.3.1-20	C
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	C
					One-Time Inspection Program	VII.H2-20	3.3.1-14	C

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	C, 310
					One-Time Inspection Program	VII.H2-20	3.3.1-14	C, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	C
					One-Time Inspection Program	VII.H2-20	3.3.1-14	C
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	C
					One-Time Inspection Program	VII.H2-20	3.3.1-14	C
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	C, 319
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	C, 319
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	C, 319

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	C
			Plant Indoor Air - Uncontrolled (Int)	None	None	VII.J-15	3.3.1-94	C
Thermowells	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A, 310
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
		Stainless Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-17	3.3.1-33	A
					One-Time Inspection Program	VII.H2-17	3.3.1-33	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-17	3.3.1-33	A
					One-Time Inspection Program	VII.H2-17	3.3.1-33	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
Turbochargers	Heat Transfer	Carbon Steel	Treated Water (Int)	Heat Transfer Degradation - Fouling	Closed-Cycle Cooling Water System Program	VII.F4-9	3.3.1-52	B
	Pressure Boundary	Carbon Steel	Diesel Exhaust (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A, 310
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A, 310

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Turbochargers	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
Valve Bodies	Pressure Boundary	Brass	Fuel Oil (Int)	Cracking - SCC/IGA	Fuel Oil Chemistry Program			H
					One-Time Inspection Program			H
				Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H2-9	3.3.1-32	B
					One-Time Inspection Program	VII.H2-9	3.3.1-32	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Brass	Fuel Oil (Int)	Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H2-9	3.3.1-32	B
					One-Time Inspection Program	VII.H2-9	3.3.1-32	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H2-9	3.3.1-32	B
					One-Time Inspection Program	VII.H2-9	3.3.1-32	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-10	3.3.1-26	A
					One-Time Inspection Program	VII.H2-10	3.3.1-26	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-10	3.3.1-26	A
					One-Time Inspection Program	VII.H2-10	3.3.1-26	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VIII.I-2	3.4.1-41	A
		Bronze	Fuel Oil (Int)	Cracking - SCC/IGA	Fuel Oil Chemistry Program			H
					One-Time Inspection Program			H

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Bronze	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H2-9	3.3.1-32	B
					One-Time Inspection Program	VII.H2-9	3.3.1-32	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H2-9	3.3.1-32	B
					One-Time Inspection Program	VII.H2-9	3.3.1-32	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H2-9	3.3.1-32	B
					One-Time Inspection Program	VII.H2-9	3.3.1-32	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-10	3.3.1-26	A
					One-Time Inspection Program	VII.H2-10	3.3.1-26	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-10	3.3.1-26	A
					One-Time Inspection Program	VII.H2-10	3.3.1-26	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VIII.I-2	3.4.1-41	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Bronze	Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.H2-13	3.3.1-84	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-8	3.3.1-51	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-8	3.3.1-51	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-7	3.3.1-84	B
		Carbon Steel	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VII.H2-24	3.3.1-20	A
				Loss of Material - Galvanic Corrosion	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	B, 310
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VII.H2-24	3.3.1-20	A, 310

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - General Corrosion	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	B
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	B
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H2-24	3.3.1-20	B
					One-Time Inspection Program	VII.H2-24	3.3.1-20	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A, 310
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-20	3.3.1-14	A
					One-Time Inspection Program	VII.H2-20	3.3.1-14	A

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
					Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
					Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 310

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
					Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
					Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
					Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.H2-23	3.3.1-47	B

Table 3.3.2-8 Auxiliary Systems- Diesel Generators and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H2-16	3.3.1-32	B
					One-Time Inspection Program	VII.H2-16	3.3.1-32	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H2-16	3.3.1-32	B
					One-Time Inspection Program	VII.H2-16	3.3.1-32	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H2-16	3.3.1-32	B
					One-Time Inspection Program	VII.H2-16	3.3.1-32	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-17	3.3.1-33	A
					One-Time Inspection Program	VII.H2-17	3.3.1-33	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-17	3.3.1-33	A
					One-Time Inspection Program	VII.H2-17	3.3.1-33	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII-C2-10	3.3.1-50	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII-C2-10	3.3.1-50	B

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Buried (Ext)	Loss of Material - Crevice Corrosion	Bolting Integrity Program			G, 306
				Loss of Material - Galvanic Corrosion	Bolting Integrity Program			G, 306
				Loss of Material - General Corrosion	Bolting Integrity Program			G, 306
				Loss of Material - MIC	Bolting Integrity Program			G, 306
				Loss of Material - Pitting Corrosion	Bolting Integrity Program			G, 306
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program			G, 304, 306
			Outdoor Air - Sheltered (Ext)	Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-1	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program			G, 304
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Stainless Steel	Primary Containment Air (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
Filter / Strainer Elements	Filter	Carbon Steel	Raw Water (Ext)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Galvanic Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A, 310
				Loss of Material - General Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - MIC	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
		Stainless Steel	Raw Water (Ext)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-19	3.3.1-69	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-19	3.3.1-69	A

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Elements	Filter	Stainless Steel	Raw Water (Ext)	Loss of Material - MIC	Fire Water System Program	VII.G-19	3.3.1-69	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-19	3.3.1-69	A
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.G-22	3.3.1-14	A
					One-Time Inspection Program	VII.G-22	3.3.1-14	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.G-22	3.3.1-14	A, 310
					One-Time Inspection Program	VII.G-22	3.3.1-14	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.G-22	3.3.1-14	A
					One-Time Inspection Program	VII.G-22	3.3.1-14	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.G-22	3.3.1-14	A
					One-Time Inspection Program	VII.G-22	3.3.1-14	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.G-23	3.3.1-71	A

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Galvanic Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A, 310
				Loss of Material - General Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - MIC	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
Fire Hydrants	Pressure Boundary	Cast Iron	Outdoor Air - Sheltered (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Galvanic Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A, 310
				Loss of Material - General Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - MIC	Fire Water System Program	VII.G-24	3.3.1-68	A

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Fire Hydrants	Pressure Boundary	Cast Iron	Raw Water (Int)	Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.G-14	3.3.1-85	B
Flex Connections	Pressure Boundary	Natural Rubber	Halon Gas (Int)	None	None			G, 313
			Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
		Rubber	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Flex Connections	Pressure Boundary	Rubber	Plant Indoor Air - Uncontrolled (Ext)	Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
			Plant Indoor Air - Uncontrolled (Int)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
			Treated Water (Int)	Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program			H, 323
				Cracking - Thermal Exposure	External Surfaces Monitoring Program			H, 323
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
		Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	C
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.C1-3	3.3.1-82	E

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Copper Alloy	Raw Water (Int)	Loss of Material - Fouling	Fire Water System Program	VII.C1-3	3.3.1-82	E
				Loss of Material - MIC	Fire Water System Program	VII.C1-3	3.3.1-82	E
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.C1-3	3.3.1-82	E
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-4	3.3.1-84	B
			Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-2	3.3.1-51	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-2	3.3.1-51	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.F1-9	3.3.1-84	B
Heat Exchanger Tubes	Heat Transfer	Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	Heat Transfer Degradation - Fouling	External Surfaces Monitoring Program			H
			Raw Water (Int)	Heat Transfer Degradation - Fouling	Fire Water System Program	VII.C1-6	3.3.1-83	E
			Treated Water (Ext)	Heat Transfer Degradation - Fouling	Closed-Cycle Cooling Water System Program	VII.C2-2	3.3.1-52	B
	Pressure Boundary	Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.C1-3	3.3.1-82	E
						VII.G-12	3.3.1-70	C

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Copper Alloy	Raw Water (Int)	Loss of Material - Fouling	Fire Water System Program	VII.C1-3	3.3.1-82	E
						VII.G-12	3.3.1-70	C
				Loss of Material - MIC	Fire Water System Program	VII.C1-3	3.3.1-82	E
						VII.G-12	3.3.1-70	C
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.C1-3	3.3.1-82	E
						VII.G-12	3.3.1-70	C
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-4	3.3.1-84	B
			Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-2	3.3.1-51	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-2	3.3.1-51	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.F1-9	3.3.1-84	B
Heaters	Pressure Boundary	Aluminum	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-2	3.2.1-50	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-15	3.4.1-15	E
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-15	3.4.1-15	E
Manifolds	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Galvanic Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A, 310
				Loss of Material - General Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - MIC	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-19	3.3.1-69	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-19	3.3.1-69	A
				Loss of Material - MIC	Fire Water System Program	VII.G-19	3.3.1-69	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-19	3.3.1-69	A
Piping / Fittings	Pressure Boundary	Carbon Steel	Buried (Ext)	Loss of Material - Crevice Corrosion	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306
				Loss of Material - Galvanic Corrosion	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306, 310

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Buried (Ext)	Loss of Material - General Corrosion	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306
				Loss of Material - MIC	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306
				Loss of Material - Pitting Corrosion	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306
			Carbon Dioxide Gas (Int)	None	None	VII.J-23	3.3.1-97	A
			Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fire Protection Program	VII.G-21	3.3.1-64	B
					Fuel Oil Chemistry Program	VII.G-21	3.3.1-64	B
				Loss of Material - Galvanic Corrosion	Fire Protection Program	VII.G-21	3.3.1-64	B, 310
					Fuel Oil Chemistry Program	VII.G-21	3.3.1-64	B, 310
				Loss of Material - General Corrosion	Fire Protection Program	VII.G-21	3.3.1-64	B
					Fuel Oil Chemistry Program	VII.G-21	3.3.1-64	B
				Loss of Material - MIC	Fire Protection Program	VII.G-21	3.3.1-64	B
					Fuel Oil Chemistry Program	VII.G-21	3.3.1-64	B
				Loss of Material - Pitting Corrosion	Fire Protection Program	VII.G-21	3.3.1-64	B
					Fuel Oil Chemistry Program	VII.G-21	3.3.1-64	B
			Halon Gas (Int)	None	None	VII.J-23	3.3.1-97	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.G-22	3.3.1-14	A
					One-Time Inspection Program	VII.G-22	3.3.1-14	A

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.G-22	3.3.1-14	A, 310
					One-Time Inspection Program	VII.G-22	3.3.1-14	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.G-22	3.3.1-14	A
					One-Time Inspection Program	VII.G-22	3.3.1-14	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.G-22	3.3.1-14	A
					One-Time Inspection Program	VII.G-22	3.3.1-14	A
			Outdoor Air - Not Sheltered (Ext)	Loss of Material - Crevice Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A
				Loss of Material - Galvanic Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A, 310
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A
				Loss of Material - Pitting Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A
			Outdoor Air - Sheltered (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VII.E1-18	3.3.1-02	A
				Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.G-23	3.3.1-71	A, 319
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.G-23	3.3.1-71	A, 319
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.G-23	3.3.1-71	A, 319
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Ext)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Galvanic Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A, 310
				Loss of Material - General Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - MIC	Fire Water System Program	VII.G-24	3.3.1-68	A

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Raw Water (Ext)	Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Galvanic Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A, 310
				Loss of Material - General Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - MIC	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
		Cast Iron	Buried (Ext)	Loss of Material - Crevice Corrosion	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306
				Loss of Material - Galvanic Corrosion	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306, 310
				Loss of Material - General Corrosion	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306
				Loss of Material - MIC	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306
				Loss of Material - Pitting Corrosion	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.G-15	3.3.1-85	B, 306

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Galvanic Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A, 310
				Loss of Material - General Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - MIC	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.G-14	3.3.1-85	B
		Copper Alloy	Fuel Oil (Int)	Cracking - SCC/IGA	Fire Protection Program			H
					Fuel Oil Chemistry Program			H
					One-Time Inspection Program			H
				Loss of Material - Crevice Corrosion	Fire Protection Program	VII.G-10	3.3.1-32	B
					Fuel Oil Chemistry Program	VII.G-10	3.3.1-32	B
					One-Time Inspection Program	VII.G-10	3.3.1-32	A

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Copper Alloy	Fuel Oil (Int)	Loss of Material - MIC	Fire Protection Program	VII.G-10	3.3.1-32	B
					Fuel Oil Chemistry Program	VII.G-10	3.3.1-32	B
					One-Time Inspection Program	VII.G-10	3.3.1-32	A
				Loss of Material - Pitting Corrosion	Fire Protection Program	VII.G-10	3.3.1-32	B
					Fuel Oil Chemistry Program	VII.G-10	3.3.1-32	B
					One-Time Inspection Program	VII.G-10	3.3.1-32	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
			Halon Gas (Int)	None	None	VII.J-4	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - MIC	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.G-13	3.3.1-84	B

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Halon Gas (Int)	None	None	VII.J-19	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-19	3.3.1-69	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-19	3.3.1-69	A
				Loss of Material - MIC	Fire Water System Program	VII.G-19	3.3.1-69	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-19	3.3.1-69	A
Pump Casings	Pressure Boundary	Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Galvanic Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A, 310
				Loss of Material - General Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - MIC	Fire Water System Program	VII.G-24	3.3.1-68	A

Table 3.3.2-9   Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Cast Iron	Raw Water (Int)	Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.G-14	3.3.1-85	B
RCP Oil Collection	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.G-26	3.3.1-15	A
					One-Time Inspection Program	VII.G-26	3.3.1-15	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.G-26	3.3.1-15	A, 310
					One-Time Inspection Program	VII.G-26	3.3.1-15	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.G-26	3.3.1-15	A
					One-Time Inspection Program	VII.G-26	3.3.1-15	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.G-26	3.3.1-15	A
					One-Time Inspection Program	VII.G-26	3.3.1-15	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
		Neoprene	Primary Containment Air (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.G-1	3.3.1-61	E

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
RCP Oil Collection	Pressure Boundary	Neoprene	Primary Containment Air (Ext)	Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.G-1	3.3.1-61	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.G-1	3.3.1-61	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.G-1	3.3.1-61	E
			Primary Containment Air (Int)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.G-1	3.3.1-61	E
				Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.G-1	3.3.1-61	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.G-1	3.3.1-61	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.G-1	3.3.1-61	E
		Stainless Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.G-18	3.3.1-33	A
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VII.G-18	3.3.1-33	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.G-18	3.3.1-33	A
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VII.G-18	3.3.1-33	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Spray Nozzles	Spray	Carbon Steel	Outdoor Air - Not Sheltered (Ext)	Loss of Material - Crevice Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A
				Loss of Material - Galvanic Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A, 310
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A
				Loss of Material - Pitting Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.G-23	3.3.1-71	A
		Copper Alloy	Outdoor Air - Not Sheltered (Ext)	Loss of Material - Crevice Corrosion	External Surfaces Monitoring Program			H
				Loss of Material - Pitting Corrosion	External Surfaces Monitoring Program			H
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - MIC	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-12	3.3.1-70	A

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Spray Nozzles	Spray	Copper Alloy	Raw Water (Int)	Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.G-13	3.3.1-84	B
Sprinkler Heads	Pressure Boundary	Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - MIC	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.G-13	3.3.1-84	B
	Spray	Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - MIC	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.G-13	3.3.1-84	B

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-22	3.3.1-98	C
			Carbon Dioxide Gas (Int)	None	None	VII.J-22	3.3.1-98	C
			Halon Gas (Int)	None	None	VII.J-22	3.3.1-98	C
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
Valve Bodies	Pressure Boundary	Brass	Carbon Dioxide Gas (Int)	None	None	VII.J-4	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - MIC	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.G-13	3.3.1-84	B

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Bronze	Carbon Dioxide Gas (Int)	None	None	VII.J-4	3.3.1-97	A
			Dry/Filtered Instrument Air (Int)	None	None	VII.J-3	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - MIC	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.G-13	3.3.1-84	B
		Carbon Steel	Carbon Dioxide Gas (Int)	None	None	VII.J-23	3.3.1-97	A
			Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fire Protection Program	VII.G-21	3.3.1-64	B
					Fuel Oil Chemistry Program	VII.G-21	3.3.1-64	B
				Loss of Material - Galvanic Corrosion	Fire Protection Program	VII.G-21	3.3.1-64	B, 310
					Fuel Oil Chemistry Program	VII.G-21	3.3.1-64	B, 310

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - General Corrosion	Fire Protection Program	VII.G-21	3.3.1-64	B
					Fuel Oil Chemistry Program	VII.G-21	3.3.1-64	B
				Loss of Material - MIC	Fire Protection Program	VII.G-21	3.3.1-64	B
					Fuel Oil Chemistry Program	VII.G-21	3.3.1-64	B
				Loss of Material - Pitting Corrosion	Fire Protection Program	VII.G-21	3.3.1-64	B
					Fuel Oil Chemistry Program	VII.G-21	3.3.1-64	B
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Galvanic Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A, 310
				Loss of Material - General Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - MIC	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
		Cast Iron	Buried (Ext)	Loss of Material - Crevice Corrosion	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306
				Loss of Material - Galvanic Corrosion	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306, 310
				Loss of Material - General Corrosion	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306
				Loss of Material - MIC	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306
				Loss of Material - Pitting Corrosion	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.G-15	3.3.1-85	B, 306
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Galvanic Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A, 310

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Cast Iron	Raw Water (Int)	Loss of Material - General Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - MIC	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-24	3.3.1-68	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.G-14	3.3.1-85	B
		Copper Alloy	Halon Gas (Int)	None	None	VII.J-4	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - MIC	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-12	3.3.1-70	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.G-13	3.3.1-84	B
		Stainless Steel	Halon Gas (Int)	None	None	VII.J-19	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-9 Auxiliary Systems- Fire Protection System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Fire Water System Program	VII.G-19	3.3.1-69	A
				Loss of Material - Fouling	Fire Water System Program	VII.G-19	3.3.1-69	A
				Loss of Material - MIC	Fire Water System Program	VII.G-19	3.3.1-69	A
				Loss of Material - Pitting Corrosion	Fire Water System Program	VII.G-19	3.3.1-69	A

Table 3.3.2-10 Auxiliary Systems - Fuel Oil System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
Filter / Strainer Elements	Filter	Stainless Steel	Fuel Oil (Ext)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H1-6	3.3.1-32	B
					One-Time Inspection Program	VII.H1-6	3.3.1-32	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H1-6	3.3.1-32	B
					One-Time Inspection Program	VII.H1-6	3.3.1-32	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H1-6	3.3.1-32	B
					One-Time Inspection Program	VII.H1-6	3.3.1-32	A
Filter / Strainer Housings	Pressure	Carbon Steel	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Galvanic Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B, 310
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A, 310

Table 3.3.2-10 Auxiliary Systems - Fuel Oil System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - General Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - General Corrosion	One-Time Inspection Program	VII.H1-10	3.3.1-20	A
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - MIC	One-Time Inspection Program	VII.H1-10	3.3.1-20	A
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VII.H1-10	3.3.1-20	A
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
Filter / Strainer Housings	Pressure Boundary	Cast Iron	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
Filter / Strainer Housings	Pressure Boundary	Cast Iron	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VII.H1-10	3.3.1-20	A
Filter / Strainer Housings	Pressure Boundary	Cast Iron	Fuel Oil (Int)	Loss of Material - Galvanic Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B, 310
Filter / Strainer Housings	Pressure Boundary	Cast Iron	Fuel Oil (Int)	Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VII.H1-10	3.3.1-20	A, 310
Filter / Strainer Housings	Pressure Boundary	Cast Iron	Fuel Oil (Int)	Loss of Material - General Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
Filter / Strainer Housings	Pressure Boundary	Cast Iron	Fuel Oil (Int)	Loss of Material - General Corrosion	One-Time Inspection Program	VII.H1-10	3.3.1-20	A
Filter / Strainer Housings	Pressure Boundary	Cast Iron	Fuel Oil (Int)	Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
Filter / Strainer Housings	Pressure Boundary	Cast Iron	Fuel Oil (Int)	Loss of Material - MIC	One-Time Inspection Program	VII.H1-10	3.3.1-20	A

Table 3.3.2-10 Auxiliary Systems - Fuel Oil System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Cast Iron	Fuel Oil (Int)	Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
Flame Arrestors	Pressure Boundary	Aluminum	Outdoor Air - Not Sheltered	None	None			G, 313
			Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-2	3.2.1-50	A
Manifolds	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Galvanic Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B, 310
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A, 310
				Loss of Material - General Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A

Table 3.3.2-10 Auxiliary Systems - Fuel Oil System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
Piping / Fittings	Pressure Boundary	Carbon Steel	Buried (Ext)	Loss of Material - Crevice Corrosion	Buried Piping and Tanks Inspection Program	VII.H1-9	3.3.1-19	A, 306
				Loss of Material - Galvanic Corrosion	Buried Piping and Tanks Inspection Program	VII.H1-9	3.3.1-19	A, 306, 310
				Loss of Material - General Corrosion	Buried Piping and Tanks Inspection Program	VII.H1-9	3.3.1-19	A, 306
				Loss of Material - MIC	Buried Piping and Tanks Inspection Program	VII.H1-9	3.3.1-19	A, 306
				Loss of Material - Pitting Corrosion	Buried Piping and Tanks Inspection Program	VII.H1-9	3.3.1-19	A, 306
			Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Galvanic Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B, 310
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A, 310
				Loss of Material - General Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A

Table 3.3.2-10 Auxiliary Systems - Fuel Oil System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
			Outdoor Air - Not Sheltered (Ext)	Loss of Material - Crevice Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A
				Loss of Material - Galvanic Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A, 310
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A
				Loss of Material - Pitting Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
		Copper Alloy	Fuel Oil (Int)	Cracking - SCC/IGA	Fuel Oil Chemistry Program			H
					One-Time Inspection Program			H
				Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H1-3	3.3.1-32	B
					One-Time Inspection Program	VII.H1-3	3.3.1-32	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H1-3	3.3.1-32	B
					One-Time Inspection Program	VII.H1-3	3.3.1-32	A

Table 3.3.2-10 Auxiliary Systems - Fuel Oil System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Copper Alloy	Fuel Oil (Int)	Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H1-3	3.3.1-32	B
					One-Time Inspection Program	VII.H1-3	3.3.1-32	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
Pump Casings	Pressure Boundary	Carbon Steel	Fuel Oil (Ext)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Galvanic Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B, 310
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A, 310
				Loss of Material - General Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A

Table 3.3.2-10 Auxiliary Systems - Fuel Oil System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Galvanic Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B, 310
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A, 310
				Loss of Material - General Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
		Cast Iron	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Galvanic Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B, 310
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A, 310

Table 3.3.2-10 Auxiliary Systems - Fuel Oil System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Cast Iron	Fuel Oil (Int)	Loss of Material - General Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
Restricting Orifices	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Galvanic Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B, 310
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A, 310
				Loss of Material - General Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A

Table 3.3.2-10 Auxiliary Systems - Fuel Oil System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Restricting Orifices	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
	Throttle	Carbon Steel	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Galvanic Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B, 310
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A, 310
				Loss of Material - General Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
Sight Glasses	Pressure Boundary	Glass	Fuel Oil (Int)	None	None	VII.J-9	3.3.1-93	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-8	3.3.1-93	A

Table 3.3.2-10 Auxiliary Systems - Fuel Oil System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Buried (Ext)	Loss of Material - Crevice Corrosion	Buried Piping and Tanks Inspection Program	VIII.E-1	3.4.1-11	A, 306
				Loss of Material - Galvanic Corrosion	Buried Piping and Tanks Inspection Program	VIII.E-1	3.4.1-11	A, 306, 310
				Loss of Material - General Corrosion	Buried Piping and Tanks Inspection Program	VIII.E-1	3.4.1-11	A, 306
				Loss of Material - MIC	Buried Piping and Tanks Inspection Program	VIII.E-1	3.4.1-11	A, 306
				Loss of Material - Pitting Corrosion	Buried Piping and Tanks Inspection Program	VIII.E-1	3.4.1-11	A, 306
			Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Galvanic Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B, 310
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A, 310
				Loss of Material - General Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A

Table 3.3.2-10 Auxiliary Systems - Fuel Oil System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Outdoor Air - Not Sheltered (Ext)	Loss of Material - Crevice Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A, 301
				Loss of Material - Galvanic Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A, 310
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A
				Loss of Material - Pitting Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A, 301
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
Valve Bodies	Pressure Boundary	Brass	Fuel Oil (Int)	Cracking - SCC/IGA	Fuel Oil Chemistry Program			H
					One-Time Inspection Program			H
				Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H1-3	3.3.1-32	B
					One-Time Inspection Program	VII.H1-3	3.3.1-32	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H1-3	3.3.1-32	B
					One-Time Inspection Program	VII.H1-3	3.3.1-32	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H1-3	3.3.1-32	B
					One-Time Inspection Program	VII.H1-3	3.3.1-32	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A

Table 3.3.2-10 Auxiliary Systems - Fuel Oil System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Bronze	Fuel Oil (Int)	Cracking - SCC/IGA	Fuel Oil Chemistry Program			H
					One-Time Inspection Program			H
				Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H1-3	3.3.1-32	B
					One-Time Inspection Program	VII.H1-3	3.3.1-32	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H1-3	3.3.1-32	B
					One-Time Inspection Program	VII.H1-3	3.3.1-32	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H1-3	3.3.1-32	B
					One-Time Inspection Program	VII.H1-3	3.3.1-32	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
		Carbon Steel	Fuel Oil (Int)	Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Galvanic Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B, 310
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A, 310
				Loss of Material - General Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A

Table 3.3.2-10 Auxiliary Systems - Fuel Oil System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Fuel Oil (Int)	Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
				Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H1-10	3.3.1-20	B
					One-Time Inspection Program	VII.H1-10	3.3.1-20	A
			Outdoor Air - Not Sheltered (Ext)	Loss of Material - Crevice Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A
				Loss of Material - Galvanic Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A, 310
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A
				Loss of Material - Pitting Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
		Copper Alloy	Fuel Oil (Int)	Cracking - SCC/IGA	Fuel Oil Chemistry Program			H
					One-Time Inspection Program			H
				Loss of Material - Crevice Corrosion	Fuel Oil Chemistry Program	VII.H1-3	3.3.1-32	B
					One-Time Inspection Program	VII.H1-3	3.3.1-32	A
				Loss of Material - MIC	Fuel Oil Chemistry Program	VII.H1-3	3.3.1-32	B
					One-Time Inspection Program	VII.H1-3	3.3.1-32	A

Table 3.3.2-10 Auxiliary Systems - Fuel Oil System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Copper Alloy	Fuel Oil (Int)	Loss of Material - Pitting Corrosion	Fuel Oil Chemistry Program	VII.H1-3	3.3.1-32	B
					One-Time Inspection Program	VII.H1-3	3.3.1-32	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 318
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
Filter / Strainer Housings	Pressure Boundary	Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 310
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Cast Iron	Treated Water (Int)	Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-9	3.3.1-85	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.C-2	3.4.1-14	A
					Water Chemistry Program	VIII.C-2	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 305
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 305
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 305, 310
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 305, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 305
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 305

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Steam (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 305
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 305
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
					One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
					One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 310
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
					One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
					One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 305
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 305
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 305, 310
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 305, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 305
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 305
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 305
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 305
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-9	3.3.1-85	D, 305
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Cast Iron	Treated Water (Int)	Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-9	3.3.1-85	D
		Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	C
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	C
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-2	3.3.1-51	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-2	3.3.1-51	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.F1-9	3.3.1-84	B
Heaters	Pressure Boundary	Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-2	3.3.1-51	B
					One-Time Inspection Program	VIII.A-5	3.4.1-15	C
					Water Chemistry Program	VIII.A-5	3.4.1-15	D
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-2	3.3.1-51	B
					One-Time Inspection Program	VIII.A-5	3.4.1-15	C
					Water Chemistry Program	VIII.A-5	3.4.1-15	D

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heaters	Pressure Boundary	Copper Alloy	Treated Water (Int)	Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-6	3.3.1-84	D
Manifolds	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 310
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.C-2	3.4.1-14	A
					Water Chemistry Program	VIII.C-2	3.4.1-14	B

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B
Piping / Fittings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Steam (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VIII.B1-10	3.4.1-01	A
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.C-5	3.4.1-29	A
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A, 310
					Water Chemistry Program	VIII.C-4	3.4.1-02	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Steam (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
			Treated Water (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VIII.B1-10	3.4.1-01	A
				Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 310
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 310
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.C-2	3.4.1-14	A
					Water Chemistry Program	VIII.C-2	3.4.1-14	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)			H
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B
Pump Casings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 310
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
		Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 310
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-9	3.3.1-85	B
		Ductile Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Ductile Iron	Treated Water (Int)	Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.C-2	3.4.1-14	A
					Water Chemistry Program	VIII.C-2	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B
Restricting Orifices	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Restricting Orifices	Pressure Boundary	Carbon Steel	Steam (Int)	Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A, 310
					Water Chemistry Program	VIII.C-4	3.4.1-02	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 310
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Restricting Orifices	Pressure Boundary	Stainless Steel	Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.C-2	3.4.1-14	A
					Water Chemistry Program	VIII.C-2	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B
Sight Glasses	Pressure Boundary	Glass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-8	3.3.1-93	A
			Treated Water (Int)	None	None	VII.J-13	3.3.1-93	A
Tanks	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.E-40	3.4.1-06	A
					Water Chemistry Program	VIII.E-40	3.4.1-06	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 310
					One-Time Inspection Program	VIII.E-40	3.4.1-06	A, 310
					Water Chemistry Program	VIII.E-40	3.4.1-06	B, 310

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.E-40	3.4.1-06	A
					Water Chemistry Program	VIII.E-40	3.4.1-06	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.E-40	3.4.1-06	A
					Water Chemistry Program	VIII.E-40	3.4.1-06	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	C
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.C-2	3.4.1-14	C
					Water Chemistry Program	VIII.C-2	3.4.1-14	D
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	C
					Water Chemistry Program	VIII.C-1	3.4.1-16	D
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	C
					Water Chemistry Program	VIII.C-1	3.4.1-16	D
Thermowells	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 310
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.C-2	3.4.1-14	A
					Water Chemistry Program	VIII.C-2	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Traps	Pressure Boundary	Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A, 310
					Water Chemistry Program	VIII.C-4	3.4.1-02	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-9	3.3.1-85	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 310
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 310

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Traps	Pressure Boundary	Cast Iron	Treated Water (Int)	Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-9	3.3.1-85	B
Valve Bodies	Pressure Boundary	Brass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.A-5	3.4.1-15	A, 305
					Water Chemistry Program	VIII.A-5	3.4.1-15	B, 305
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.A-5	3.4.1-15	A, 305
					Water Chemistry Program	VIII.A-5	3.4.1-15	B, 305
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-7	3.3.1-84	B, 305
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-4	3.3.1-51	B
					One-Time Inspection Program	VIII.A-5	3.4.1-15	A
					Water Chemistry Program	VIII.A-5	3.4.1-15	B

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Brass	Treated Water (Int)	Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-4	3.3.1-51	B
					One-Time Inspection Program	VIII.A-5	3.4.1-15	A
					Water Chemistry Program	VIII.A-5	3.4.1-15	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-7	3.3.1-84	B
		Bronze	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.A-5	3.4.1-15	A, 305
					Water Chemistry Program	VIII.A-5	3.4.1-15	B, 305
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.C-5	3.4.1-29	A
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.A-5	3.4.1-15	A, 305
					Water Chemistry Program	VIII.A-5	3.4.1-15	B, 305
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-7	3.3.1-84	B, 305
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-4	3.3.1-51	B
					One-Time Inspection Program	VIII.A-5	3.4.1-15	A
					Water Chemistry Program	VIII.A-5	3.4.1-15	B

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Bronze	Treated Water (Int)	Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-4	3.3.1-51	B
					One-Time Inspection Program	VIII.A-5	3.4.1-15	A
					Water Chemistry Program	VIII.A-5	3.4.1-15	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-7	3.3.1-84	B
		Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.C-5	3.4.1-29	A
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A, 310
					Water Chemistry Program	VIII.C-4	3.4.1-02	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.E-35	3.4.1-29	A
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 310
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 310
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
		Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Cast Iron	Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A, 310
					Water Chemistry Program	VIII.C-4	3.4.1-02	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-9	3.3.1-85	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 310
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 310
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 310

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Cast Iron	Treated Water (Int)	Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-9	3.3.1-85	B
		Ductile Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 310
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 310
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 310

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Ductile Iron	Treated Water (Int)	Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.A-10	3.4.1-39	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.C-2	3.4.1-14	A
					Water Chemistry Program	VIII.C-2	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B

Table 3.3.2-11 Auxiliary Systems - Heating System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B

Table 3.3.2-12 Auxiliary Systems - Miscellaneous Gas System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
			Primary Containment Air (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
Piping / Fittings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

Table 3.3.2-12 Auxiliary Systems - Miscellaneous Gas System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
		Stainless Steel	Nitrogen Gas (Int)	None	None	VII.J-19	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
Valve Bodies	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
		Stainless Steel	Nitrogen Gas (Int)	None	None	VII.J-19	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-13 Auxiliary Systems- Plant Sample System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Freon Gas (Int)	None	None	VII.J-23	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Cracking - Stress Corrosion Cracking (SCC)	Closed-Cycle Cooling Water System Program			H
				Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B

Table 3.3.2-13 Auxiliary Systems- Plant Sample System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - MIC	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B, 301
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
		Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-9	3.3.1-85	D
Heat Exchanger Tubes	Pressure Boundary	Copper Alloy	Freon Gas (Int)	None	None	VII.J-4	3.3.1-97	C
			Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-2	3.3.1-51	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-2	3.3.1-51	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.F1-9	3.3.1-84	B

Table 3.3.2-13 Auxiliary Systems- Plant Sample System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Stainless Steel	Treated Water (Ext)	Cracking - SCC/IGA	Closed-Cycle Cooling Water System Program	VII.C2-11	3.3.1-46	D
				Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.F-3	3.4.1-14	A
					Water Chemistry Program	VIII.F-3, VII.E1-20	3.4.1-14, 3.3.1-90	D
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VII.E1-4	3.3.1-02	A
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-36	3.4.1-16	A
					Water Chemistry Program	VIII.E-36, VII.E1-17	3.4.1-16, 3.3.1-91	D
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-36	3.4.1-16	A
					Water Chemistry Program	VIII.E-36, VII.E1-17	3.4.1-16, 3.3.1-91	D
Manifolds	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B

Table 3.3.2-13 Auxiliary Systems- Plant Sample System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 310
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.B1-5	3.4.1-14	A
					Water Chemistry Program	VIII.B1-5	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4	3.4.1-16	B
Piping / Fittings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

Table 3.3.2-13 Auxiliary Systems- Plant Sample System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Treated Water (Int)	Cracking - Stress Corrosion Cracking (SCC)	Closed-Cycle Cooling Water System Program			H
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VIII.B1-10	3.4.1-01	A
				Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 310
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 310
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - MIC	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 301
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A

Table 3.3.2-13 Auxiliary Systems- Plant Sample System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.C-7	3.4.1-04	B
		Copper Alloy	Freon Gas (Int)	None	None	VII.J-4	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.B1-5	3.4.1-14	A
					Water Chemistry Program	VIII.B1-5, VII.E1-20	3.4.1-14, 3.3.1-90	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VII.E1-16	3.3.1-02	A
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4, VII.E1-17	3.4.1-16, 3.3.1-91	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4, VII.E1-17	3.4.1-16, 3.3.1-91	B
Pump Casings	Pressure Boundary	Carbon Steel	Freon Gas (Int)	None	None	VII.J-23	3.3.1-97	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

Table 3.3.2-13 Auxiliary Systems- Plant Sample System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Carbon Steel	Treated Water (Int)	Cracking - Stress Corrosion Cracking (SCC)	Closed-Cycle Cooling Water System Program			H
				Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 310
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 310
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - MIC	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 301
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B

Table 3.3.2-13 Auxiliary Systems- Plant Sample System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.B1-5	3.4.1-14	A
					Water Chemistry Program	VIII.B1-5	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4	3.4.1-16	B
Sight Glasses	Pressure Boundary	Glass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-8	3.3.1-93	A
			Treated Water (Int)	None	None	VII.J-13	3.3.1-93	A
Tanks	Pressure Boundary	Carbon Steel	Freon Gas (Int)	None	None	VII.J-23	3.3.1-97	C
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Cracking - Stress Corrosion Cracking (SCC)	Closed-Cycle Cooling Water System Program			H
				Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 310
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B

Table 3.3.2-13 Auxiliary Systems- Plant Sample System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - MIC	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 301
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	C
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.B1-5	3.4.1-14	C
					Water Chemistry Program	VIII.B1-5, VII.E1-20	3.4.1-14, 3.3.1-90	D
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	C
					Water Chemistry Program	VIII.B1-4, VII.E1-17	3.4.1-16, 3.3.1-91	D
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	C
					Water Chemistry Program	VIII.B1-4, VII.E1-17	3.4.1-16, 3.3.1-91	D
Thermowells	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B

Table 3.3.2-13 Auxiliary Systems- Plant Sample System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 310
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.B1-5	3.4.1-14	A
					Water Chemistry Program	VIII.B1-5	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4	3.4.1-16	B
Valve Bodies	Pressure Boundary	Brass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-4	3.3.1-51	B

Table 3.3.2-13 Auxiliary Systems- Plant Sample System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Brass	Treated Water (Int)	Loss of Material - MIC	Closed-Cycle Cooling Water System Program	VII.C2-4	3.3.1-51	B, 301
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-4	3.3.1-51	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.E1-13	3.3.1-84	B
		Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Cracking - Stress Corrosion Cracking (SCC)	Closed-Cycle Cooling Water System Program			H
				Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 310
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 310
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 310

Table 3.3.2-13 Auxiliary Systems- Plant Sample System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - MIC	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B, 301
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-14	3.3.1-47	B
					One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
		Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-4	3.3.1-51	B
				Loss of Material - MIC	Closed-Cycle Cooling Water System Program	VII.C2-4	3.3.1-51	B, 301
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-4	3.3.1-51	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.E1-13	3.3.1-84	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-13 Auxiliary Systems- Plant Sample System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.B1-5	3.4.1-14	A
					Water Chemistry Program	VIII.B1-5, VII.E1-20	3.4.1-14, 3.3.1-90	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4, VII.E1-17	3.4.1-16, 3.3.1-91	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4, VII.E1-17	3.4.1-16, 3.3.1-91	B

Table 3.3.2-14 Auxiliary Systems- Primary Containment Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F3-4	3.3.1-55	A
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F3-4	3.3.1-55	A
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
			Primary Containment Air (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304

Table 3.3.2-14 Auxiliary Systems- Primary Containment Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Damper / Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F3-2	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F3-2	3.3.1-56	A
			Primary Containment Air (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319
Ducting and Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319
		Galvanized Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

Table 3.3.2-14 Auxiliary Systems- Primary Containment Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Ducting and Components	Pressure Boundary	Galvanized Steel	Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319
Fan Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F3-2	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F3-2	3.3.1-56	A
			Primary Containment Air (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319

Table 3.3.2-14 Auxiliary Systems- Primary Containment Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Elements	Filter	Stainless Steel	Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F3-2	3.3.1-56	A
			Primary Containment Air (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319
Flex Connections	Pressure Boundary	EPDM	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E

Table 3.3.2-14 Auxiliary Systems- Primary Containment Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Flex Connections	Pressure Boundary	EPDM	Plant Indoor Air - Uncontrolled (Ext)	Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Loss of Material - Wear	External Surfaces Monitoring Program	VII.F3-5	3.3.1-34	E
			Plant Indoor Air - Uncontrolled (Int)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Loss of Material - Wear	External Surfaces Monitoring Program	VII.F3-6	3.3.1-34	E
			Primary Containment Air (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E

Table 3.3.2-14 Auxiliary Systems- Primary Containment Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Flex Connections	Pressure Boundary	EPDM	Primary Containment Air (Ext)	Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Loss of Material - Wear	External Surfaces Monitoring Program	VII.F3-5	3.3.1-34	E
			Primary Containment Air (Int)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Loss of Material - Wear	External Surfaces Monitoring Program	VII.F3-6	3.3.1-34	E
Flow Elements	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-14 Auxiliary Systems- Primary Containment Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Flow Elements	Pressure Boundary	Stainless Steel	Primary Containment Air (Int)	None	None	VII.J-15	3.3.1-94	A
Heat Exchanger Components	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	C
			Primary Containment Air (Int)	None	None	VII.J-15	3.3.1-94	C
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
Heat Exchanger Tubes	Heat Transfer	Copper-Nickel	Primary Containment Air (Ext)	Heat Transfer Degradation - Fouling	External Surfaces Monitoring Program			H
			Raw Water (Int)	Heat Transfer Degradation - Fouling	Open-Cycle Cooling Water System Program	VII.C1-6	3.3.1-83	A
	Pressure Boundary	Copper-Nickel	Primary Containment Air (Ext)	None	None	VIII.I-2	3.4.1-41	C
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A

Table 3.3.2-14 Auxiliary Systems- Primary Containment Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Copper-Nickel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Erosion	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A, 301
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-4	3.3.1-84	B
Manifolds	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319

Table 3.3.2-14 Auxiliary Systems- Primary Containment Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Int)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Int)	None	None	VII.J-15	3.3.1-94	A
Piping / Fittings	Pressure Boundary	Carbon Steel	Outdoor Air - Not Sheltered (Ext)	Loss of Material - Crevice Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A, 301
				Loss of Material - Galvanic Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A, 301
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A
				Loss of Material - Pitting Corrosion	External Surfaces Monitoring Program	VII.I-9	3.3.1-58	A, 301
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319

Table 3.3.2-14 Auxiliary Systems- Primary Containment Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319
		Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VIII.I-2	3.4.1-41	A
			Primary Containment Air (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Primary Containment Air (Int)	None	None	VIII.I-2	3.4.1-41	A
		Stainless Steel	Plant Indoor Air - Uncontrolled (Int)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Int)	None	None	VII.J-15	3.3.1-94	A
Restricting Orifices	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Int)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-14 Auxiliary Systems- Primary Containment Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Sample Points	Pressure Boundary	Rubber	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
			Plant Indoor Air - Uncontrolled (Int)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
			Primary Containment Air (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E

Table 3.3.2-14 Auxiliary Systems- Primary Containment Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Sample Points	Pressure Boundary	Rubber	Primary Containment Air (Ext)	Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
			Primary Containment Air (Int)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.F3-7	3.3.1-11	E
Valve Bodies	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

Table 3.3.2-14 Auxiliary Systems- Primary Containment Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F3-3	3.3.1-72	A, 319

Table 3.3.2-15 Auxiliary Systems - Radiation Monitoring System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
			Primary Containment Air (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-21	3.3.1-71	A, 319
Heat Exchanger Tubes	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	C
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A

Table 3.3.2-15 Auxiliary Systems - Radiation Monitoring System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
Piping / Fittings	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Int)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.E-30	3.4.1-14	A
					Water Chemistry Program	VIII.E-30	3.4.1-14	B

Table 3.3.2-15 Auxiliary Systems - Radiation Monitoring System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
					One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
					One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
Valve Bodies	Pressure Boundary	Brass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Plant Indoor Air - Uncontrolled (Int)	None	None	VIII.I-2	3.4.1-41	A
			Primary Containment Air (Int)	None	None	VIII.I-2	3.4.1-41	A
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Int)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-15 Auxiliary Systems - Radiation Monitoring System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.H2-18	3.3.1-80	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.E-30	3.4.1-14	A
					Water Chemistry Program	VIII.E-30	3.4.1-14	B
				Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
					One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-10	3.3.1-50	B
					One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B

Table 3.3.2-16 Auxiliary Systems- Spent Fuel Pool Cooling System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
Demineralizers	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B
Filter / Strainer Housings	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B

Table 3.3.2-16 Auxiliary Systems- Spent Fuel Pool Cooling System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.A3-2	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.A3-3	3.3.1-48	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.A3-3	3.3.1-48	B
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.A3-3	3.3.1-48	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.A3-3	3.3.1-48	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	C
			Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	D
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	D
Heat Exchanger Tubes	Pressure Boundary	Stainless Steel	Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B

Table 3.3.2-16 Auxiliary Systems- Spent Fuel Pool Cooling System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	D
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	D
Manifolds	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B
Piping / Fittings	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B
Pump Casings	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B
Restricting Orifices	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-16 Auxiliary Systems- Spent Fuel Pool Cooling System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Restricting Orifices	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B
Thermowells	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B
Valve Bodies	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Treated Water (Ext)	Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VII.A3-8	3.3.1-91	B

Table 3.3.2-17 Auxiliary Systems - Station and Instrument Air System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Air Dryers	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.D-3	3.3.1-57	A
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	B, 301
				Loss of Material - General Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	B
				Loss of Material - Pitting Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	B
Air Regulators	Pressure Boundary	Aluminum	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.A3-4	3.3.1-88	A
				None	None	V.F-2	3.2.1-50	A
		Brass	Dry/Filtered Instrument Air (Int)	None	None	VII.J-3	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
		Bronze	Dry/Filtered Instrument Air (Int)	None	None	VII.J-3	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
		Carbon Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-22	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.D-3	3.3.1-57	A

Table 3.3.2-17 Auxiliary Systems - Station and Instrument Air System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	C
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program			H, 304
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	C
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program			H, 304
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304

Table 3.3.2-17 Auxiliary Systems - Station and Instrument Air System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Stainless Steel	Primary Containment Air (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
Filter / Strainer Housings	Pressure Boundary	Aluminum	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-2	3.2.1-50	A
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Compressed Air Monitoring Program	VII.F2-12	3.3.1-27	E
				Loss of Material - Pitting Corrosion	Compressed Air Monitoring Program	VII.F2-12	3.3.1-27	E
		Carbon Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-22	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.D-3	3.3.1-57	A
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	B, 301
				Loss of Material - General Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	B
				Loss of Material - Pitting Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	B
		Stainless Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-18	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Compressed Air Monitoring Program	VII.D-4	3.3.1-54	B
				Loss of Material - Pitting Corrosion	Compressed Air Monitoring Program	VII.D-4	3.3.1-54	B

Table 3.3.2-17 Auxiliary Systems - Station and Instrument Air System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Flex Connections	Pressure Boundary	PVC	Dry/Filtered Instrument Air (Int)	None	None			F, 313
			Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program			F
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program			F
				Cracking - Ozone Exposure	External Surfaces Monitoring Program			F
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program			F
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.D-3	3.3.1-57	A
			Raw Water (Ext)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A

Table 3.3.2-17 Auxiliary Systems - Station and Instrument Air System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-5	3.3.1-77	A
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	D, 301
				Loss of Material - General Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	D
				Loss of Material - Pitting Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	D
Heat Exchanger Tubes	Pressure Boundary	Copper Alloy	Raw Water (Ext)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-3	3.3.1-82	A

Table 3.3.2-17 Auxiliary Systems - Station and Instrument Air System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Copper Alloy	Raw Water (Ext)	Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-4	3.3.1-84	B
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Compressed Air Monitoring Program	VII.G-9	3.3.1-28	E
				Loss of Material - Pitting Corrosion	Compressed Air Monitoring Program	VII.G-9	3.3.1-28	E
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-4	3.3.1-84	B
Manifolds	Pressure Boundary	Carbon Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-22	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.D-3	3.3.1-57	A
		Stainless Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-18	3.3.1-98	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
Piping / Fittings	Pressure Boundary	Carbon Steel	Buried (Ext)	Loss of Material - Crevice Corrosion	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306
				Loss of Material - Galvanic Corrosion	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306, 310
				Loss of Material - General Corrosion	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306

Table 3.3.2-17 Auxiliary Systems - Station and Instrument Air System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Buried (Ext)	Loss of Material - MIC	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306
				Loss of Material - Pitting Corrosion	Buried Piping and Tanks Inspection Program	VII.G-25	3.3.1-19	A, 306
			Dry/Filtered Instrument Air (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Table 4.3.2)	VII.E1-18	3.3.1-02	A
				None	None	VII.J-22	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.D-3	3.3.1-57	A
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	B, 301
				Loss of Material - General Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	B
				Loss of Material - Pitting Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	B
		Copper Alloy	Dry/Filtered Instrument Air (Int)	None	None	VII.J-3	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Primary Containment Air (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A

Table 3.3.2-17 Auxiliary Systems - Station and Instrument Air System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-18	3.3.1-98	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
Restricting Orifices	Pressure Boundary	Stainless Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-18	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
Sight Glasses	Pressure Boundary	Glass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-8	3.3.1-93	A
			Wet Air/Gas (Int)	None	None	VII.J-7	3.3.1-93	A
Tanks	Pressure Boundary	Carbon Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-22	3.3.1-98	C
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	D, 301

Table 3.3.2-17 Auxiliary Systems - Station and Instrument Air System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Wet Air/Gas (Int)	Loss of Material - General Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	D
				Loss of Material - Pitting Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	D
Thermowells	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.D-3	3.3.1-57	A
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	B, 301
				Loss of Material - General Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	B
				Loss of Material - Pitting Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	B
Valve Bodies	Pressure Boundary	Aluminum	Dry/Filtered Instrument Air (Int)	None	None	V.F-2	3.2.1-50	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.A3-4	3.3.1-88	A
				None	None	V.F-2	3.2.1-50	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.A3-4	3.3.1-88	A
		Brass	Dry/Filtered Instrument Air (Int)	None	None	VII.J-3	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A

Table 3.3.2-17 Auxiliary Systems - Station and Instrument Air System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Brass	Primary Containment Air (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Compressed Air Monitoring Program	VII.G-9	3.3.1-28	E
				Loss of Material - Pitting Corrosion	Compressed Air Monitoring Program	VII.G-9	3.3.1-28	E
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-10	3.3.1-84	B
		Bronze	Dry/Filtered Instrument Air (Int)	None	None	VII.J-3	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Primary Containment Air (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A

Table 3.3.2-17 Auxiliary Systems - Station and Instrument Air System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Bronze	Raw Water (Int)	Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-10	3.3.1-84	B
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Compressed Air Monitoring Program	VII.G-9	3.3.1-28	E
				Loss of Material - Pitting Corrosion	Compressed Air Monitoring Program	VII.G-9	3.3.1-28	E
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-10	3.3.1-84	B
		Carbon Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-22	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.D-3	3.3.1-57	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.D-3	3.3.1-57	A
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	B
				Loss of Material - General Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	B
				Loss of Material - Pitting Corrosion	Compressed Air Monitoring Program	VII.D-2	3.3.1-53	B

Table 3.3.2-17 Auxiliary Systems - Station and Instrument Air System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.D-3	3.3.1-57	A
		Copper Alloy	Dry/Filtered Instrument Air (Int)	None	None	VII.J-3	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Primary Containment Air (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
		Galvanized Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.D-3	3.3.1-57	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.D-3	3.3.1-57	A
		Stainless Steel	Dry/Filtered Instrument Air (Int)	None	None	VII.J-18	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-18 Auxiliary Systems - Steam Exclusion System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
Damper / Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F2-3	3.3.1-72	A, 319
Ducting and Components	Pressure Boundary	Galvanized Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F2-3	3.3.1-72	A, 319

Table 3.3.2-19 Auxiliary Systems - Turbine and Administration Building Ventilation System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F2-4	3.3.1-55	A
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
Ducting and Components	Pressure Boundary	Galvanized Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F2-2	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F2.3	3.3.1-72	A, 319
Fan Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F2-2	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F2.3	3.3.1-72	A, 319
Valve Bodies	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.F2-2	3.3.1-56	A
			Plant Indoor Air - Uncontrolled (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.F2.3	3.3.1-72	A, 319

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-2	3.3.1-89	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
			Primary Containment Air (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
Decontamination Equipment	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Decontamination Equipment	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
Demineralizers	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310, 320
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
		Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310, 320
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Cast Iron	Raw Water (Int)	Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-11	3.3.1-85	B, 320
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
Flex Connections	Pressure Boundary	Natural Rubber	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Flex Connections	Pressure Boundary	Natural Rubber	Plant Indoor Air - Uncontrolled (Ext)	Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
			Raw Water (Int)	None	None			G, 313
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Ext)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-5	3.3.1-77	E

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Raw Water (Ext)	Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-5	3.3.1-77	E
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-5	3.3.1-77	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-5	3.3.1-77	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-5	3.3.1-77	E
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-5	3.3.1-77	E
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-5	3.3.1-77	E
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-5	3.3.1-77	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-5	3.3.1-77	E

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-5	3.3.1-77	E
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Galvanic Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - General Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.C2-1	3.3.1-48	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	C
			Raw Water (Ext)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-3	3.4.1-33	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-3	3.4.1-33	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-3	3.4.1-33	E
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-3	3.4.1-33	E

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-3	3.4.1-33	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-3	3.4.1-33	E
			Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
Heat Exchanger Tubes	Pressure Boundary	Copper Alloy	Raw Water (Ext)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-3	3.3.1-82	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-3	3.3.1-82	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-3	3.3.1-82	E
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-4	3.3.1-84	B

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Copper Alloy	Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-2	3.3.1-51	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VII.E1-2	3.3.1-51	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.F1-9	3.3.1-84	B
		Stainless Steel	Raw Water (Ext)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-3	3.4.1-33	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-3	3.4.1-33	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-3	3.4.1-33	E
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-3	3.4.1-33	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-3	3.4.1-33	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-3	3.4.1-33	E

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Stainless Steel	Treated Water (Ext)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
				Loss of Material - Pitting Corrosion	Closed-Cycle Cooling Water System Program	VIII.E-2	3.4.1-25	B
Manifolds	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310, 320
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
Piping / Fittings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310, 320
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VII.E1-16	3.3.1-02	A

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
Pump Casings	Pressure Boundary	Cast Austenitic Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
		Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Cast Iron	Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310, 320
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-11	3.3.1-85	B, 320
		Stainless Steel	Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
Restricting Orifices	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
Rupture Discs	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Rupture Discs	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
Sight Glasses	Pressure Boundary	Glass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-8	3.3.1-93	A
			Raw Water (Int)	None	None	VII.J-11	3.3.1-93	A
Tanks	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program			H, 320
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program			H, 310, 320
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program			H, 320

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program			H, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program			H, 320
		PVC	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program			F
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program			F
				Cracking - Ozone Exposure	External Surfaces Monitoring Program			F
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program			F
			Raw Water (Int)	None	None			F, 313
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	C
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	C
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program			H, 320

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program			H, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program			H, 320
Thermowells	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310, 320
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
Valve Bodies	Pressure Boundary	Brass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-9	3.3.1-81	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-9	3.3.1-81	E, 320

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Brass	Raw Water (Int)	Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-9	3.3.1-81	E, 320
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-10	3.3.1-84	B, 320
		Bronze	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
				None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-9	3.3.1-81	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-9	3.3.1-81	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-9	3.3.1-81	E, 320
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-10	3.3.1-84	B, 320
		Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310, 320
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 320
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.D-2	3.3.1-53	E, 301

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Wet Air/Gas (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.D-2	3.3.1-53	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.D-2	3.3.1-53	E
		Cast Austenitic Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-20 Auxiliary Systems- Waste Disposal System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E, 320

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	Bolting Integrity Program	VII.I-4	3.3.1-43	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VII.I-5	3.3.1-45	B, 304
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 304
Demineralizers	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Demineralizers	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 310
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
		PVC	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program			F
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program			F
				Cracking - Ozone Exposure	External Surfaces Monitoring Program			F
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program			F
			Raw Water (Int)	None	None			F, 313

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Demineralizers	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
Eductors	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Eductors	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
Flex Connections	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heaters	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heaters	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
Manifolds	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
Piping / Fittings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.C1-17	3.3.1-14	A
					One-Time Inspection Program	VII.C1-17	3.3.1-14	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.C1-17	3.3.1-14	A, 310
					One-Time Inspection Program	VII.C1-17	3.3.1-14	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.C1-17	3.3.1-14	A
					One-Time Inspection Program	VII.C1-17	3.3.1-14	A

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.C1-17	3.3.1-14	A
					One-Time Inspection Program	VII.C1-17	3.3.1-14	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-9	3.3.1-81	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-9	3.3.1-81	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-9	3.3.1-81	E
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-10	3.3.1-84	B
		PVC	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program			F
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program			F
				Cracking - Ozone Exposure	External Surfaces Monitoring Program			F
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program			F
			Raw Water (Int)	None	None			F, 313

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
Pump Casings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.C1-17	3.3.1-14	A
					One-Time Inspection Program	VII.C1-17	3.3.1-14	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VII.C1-17	3.3.1-14	A, 310
					One-Time Inspection Program	VII.C1-17	3.3.1-14	A, 310
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VII.C1-17	3.3.1-14	A
					One-Time Inspection Program	VII.C1-17	3.3.1-14	A

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.C1-17	3.3.1-14	A
					One-Time Inspection Program	VII.C1-17	3.3.1-14	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	PVC	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program			F
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program			F
				Cracking - Ozone Exposure	External Surfaces Monitoring Program			F
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program			F
			Raw Water (Int)	None	None			F, 313
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Restricting Orifices	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.E-29	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.E-29	3.4.1-16	B
Sight Glasses	Pressure Boundary	Glass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-8	3.3.1-93	A
			Treated Water (Int)	None	None	VII.J-13	3.3.1-93	A

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program			H
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program			H, 310
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program			H
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program			H
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program			H
		Fiberglass	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program			F
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program			F

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Fiberglass	Plant Indoor Air - Uncontrolled (Ext)	Cracking - Ozone Exposure	External Surfaces Monitoring Program			F
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program			F
			Raw Water (Int)	None	None			F, 313
Thermowells	Pressure Boundary	PVC	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program			F
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program			F
				Cracking - Ozone Exposure	External Surfaces Monitoring Program			F
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program			F
			Raw Water (Int)	None	None			F, 313
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
Valve Bodies	Pressure Boundary	Brass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-9	3.3.1-81	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-9	3.3.1-81	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-9	3.3.1-81	E
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-10	3.3.1-84	B
		Bronze	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-9	3.3.1-81	E

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Bronze	Raw Water (Int)	Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-9	3.3.1-81	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-9	3.3.1-81	E
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-10	3.3.1-84	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-15	3.4.1-15	A
					Water Chemistry Program	VIII.F-15	3.4.1-15	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-15	3.4.1-15	A
					Water Chemistry Program	VIII.F-15	3.4.1-15	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-7	3.3.1-84	B
		Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-10	3.3.1-89	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 310
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VII.I-8	3.3.1-58	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E, 310
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19	3.3.1-76	E
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C1-11	3.3.1-85	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Cast Iron	Treated Water (Int)	Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 310
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 310
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VII.C2-9	3.3.1-85	B
		PVC	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program			F
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program			F
				Cracking - Ozone Exposure	External Surfaces Monitoring Program			F
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program			F
			Raw Water (Int)	None	None			F, 313
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VII.J-15	3.3.1-94	A
			Primary Containment Air (Ext)	None	None	VII.J-15	3.3.1-94	A

Table 3.3.2-21 Auxiliary Systems - Water Treatment System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B

Notes for Tables 3.3.2-1 through 3.3.2-21

A Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

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

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

D Component is different, but consistent with NUREG-1801 for material, environment, and aging effect. AMP takes 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 for this component.

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

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

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

J Neither the component nor the material and environment combination are evaluated in NUREG-1801.

Plant-specific notes:

301 Aging mechanism(s) is not in NUREG-1801 for this component, material, and environment combination.

302 Intentionally left blank.

303 Intentionally left blank.

304 There are no bolts with a specified minimum yield strength >150 ksi in this system. Therefore, SCC is not an applicable aging effect/mechanism.

305 A Steam environment is evaluated the same as a Treated Water environment.

306 Components that are buried in the ground are analyzed in the same manner as raw water (damp soil containing groundwater).

307 No credit is taken for protective coatings (paint, galvanized pipe, linings, etc.) for components in the PINGP mechanical aging management evaluations.

308 In some cases where the Plant Chemistry Program is not a viable option and aging effects/mechanisms are not expected to be significant; the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program alone is credited for managing these aging effects. The AMP referenced is appropriate for the aging effect(s)/mechanism(s) identified and provides assurance that the aging effect(s)/mechanism(s) are effectively managed through the period of extended operation.

309 Intentionally left blank.

310 Loss of material due to galvanic corrosion is evaluated in a raw water, treated water, fuel oil, lubricating oil, and wet air/gas (if applicable) environment.

311 The Unit 2 Pressurizer surge nozzle to safe end weld is Alloy 82. Examinations of the weld are conducted by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program.

312 The aging effect/mechanism, cracking due to stress corrosion cracking, was assigned to this component based on industry Operating Experience.

313 Materials science evaluation for this material in this environment results in no aging effects.

314 Unit 2 steam generators are Westinghouse Model 51 Steam Generators and have experienced corrosion. Therefore, additional inspections to detect general and pitting corrosion are performed on the shell to transition cone weld under the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program.

315 Denting of the steam generator U-tubes is only applicable to Unit 2. Unit 1 U-tubes are held in place by stainless steel tube support plates with broached holes.

316 Loss of material due to MIC is evaluated for stainless steel in a raw water environment.

317 Dry/Filtered Instrument Air is evaluated the same as gas.

318 Loss of material due to selective leaching for copper alloys and gray cast iron is evaluated in a fuel oil and lubricating oil environment.

319 The environment for this line item is equivalent to Plant Indoor Air - Uncontrolled with the potential for moisture or condensation.

320 The environment for this component is evaluated as Raw Water and is essentially waste water or a potential mixture of water and oil.

321 This line item includes both heat exchanger components and non-regenerative heat exchanger components.

322 Chrome-molybdenum alloy components are evaluated the same as steel (carbon steel, low-alloy steel and cast iron) components.

323 The External Surfaces Monitoring Program is credited with managing aging effects of internal surfaces where the external surfaces are subject to the same environment or stressor as the internal surfaces such that that external condition is representative of the internal surface condition.

3.4 Aging Management of Steam and Power Conversion System

3.4.1 Introduction

This section provides the results of the AMR for those Steam and Power Conversion System components identified in Section 2.3.4 as being subject to an AMR. The systems, or portions of systems, which are addressed in this section, are described in the indicated sections.

- Auxiliary Feedwater System (Section 2.3.4.1)
- Bleed Steam System (Section 2.3.4.2)
- Circulating Water System (Section 2.3.4.3)
- Condensate System (Section 2.3.4.4)
- Feedwater System (Section 2.3.4.5)
- Main Steam System (Section 2.3.4.6)
- Steam Generator Blowdown System (Section 2.3.4.7)
- Turbine Generator and Support System (Section 2.3.4.8)

Table 3.4.1, Summary of Aging Management Evaluations in Chapter VIII of NUREG-1801 for Steam and Power Conversion System, provides the summary of the programs evaluated in NUREG-1801 for the Steam and Power Conversion System components that are relied on for License Renewal. This table uses the format described in Section 3.0. Note that this table only includes those components that are applicable to a PWR.

3.4.2 Results

The following tables summarize the results of the AMR for systems in the Steam and Power Conversion System group:

Table 3.4.2-1, Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Table 3.4.2-2, Steam and Power Conversion System - Bleed Steam System - Summary of Aging Management Evaluation

Table 3.4.2-3, Steam and Power Conversion System - Circulating Water System - Summary of Aging Management Evaluation

Table 3.4.2-4, Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Table 3.4.2-5, Steam and Power Conversion System - Feedwater System - Summary of Aging Management Evaluation

Table 3.4.2-6, Steam and Power Conversion System - Main Steam System - Summary of Aging Management Evaluation

Table 3.4.2-7, Steam and Power Conversion System - Steam Generator Blowdown System - Summary of Aging Management Evaluation

Table 3.4.2-8, Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

The materials that specific components are fabricated from, the environments to which components are exposed, the potential aging effects requiring management, and the AMPs used to manage these aging effects are provided for each of the above systems in the following subsections of Section 3.4.2.1, Materials, Environment, Aging Effects Requiring Management and Aging Management Programs:

Section 3.4.2.1.1, Auxiliary Feedwater System

Section 3.4.2.1.2, Bleed Steam System

Section 3.4.2.1.3, Circulating Water System

Section 3.4.2.1.4, Condensate System

Section 3.4.2.1.5, Feedwater System

Section 3.4.2.1.6, Main Steam System

Section 3.4.2.1.7, Steam Generator Blowdown System

Section 3.4.2.1.8, Turbine Generator and Support System

3.4.2.1 Materials, Environment, Aging Effects Requiring Management and Aging Management Programs

3.4.2.1.1 Auxiliary Feedwater System

Materials

The materials of construction for the AF System components are:

- Bronze
- Carbon Steel
- Cast Iron
- Copper Alloy
- Stainless Steel

Environment

The AF System components are exposed to the following environments:

- Hydraulic Oil (External)
- Hydraulic Oil (Internal)
- Lubricating Oil (External)
- Lubricating Oil (Internal)
- Plant Indoor Air - Uncontrolled (External)
- Primary Containment Air (External)
- Treated Water (External)
- Treated Water (Internal)
- Wet Air/Gas (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the AF System, require management:

- Heat Transfer Degradation - Fouling
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the AF System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- External Surfaces Monitoring Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program
- Lubricating Oil Analysis Program

- One-Time Inspection Program
- Selective Leaching of Materials Program
- Water Chemistry Program

3.4.2.1.2 Bleed Steam System

Materials

The materials of construction for the BL System components are:

- Carbon Steel
- Chrome-molybdenum Alloy
- Stainless Steel

Environment

The BL System components are exposed to the following environments:

- Plant Indoor Air - Uncontrolled (External)
- Steam (Internal)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the BL System, require management:

- Cracking - SCC/IGA
- Loss of Material - Crevice Corrosion
- Loss of Material - FAC
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - Pitting Corrosion
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the BL System components:

- Bolting Integrity Program
- External Surfaces Monitoring Program
- Flow-Accelerated Corrosion Program

- One-Time Inspection Program
- Water Chemistry Program

3.4.2.1.3 Circulating Water System

Materials

The materials of construction for the CW System components are:

- Brass
- Bronze
- Carbon Steel
- Cast Austenitic Stainless Steel
- Cast Iron
- Copper Alloy
- Glass
- Natural Rubber
- PVC
- Stainless Steel

Environment

The CW System components are exposed to the following environments:

- Plant Indoor Air - Uncontrolled (External)
- Raw Water (Internal)
- Steam (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the CW System, require management:

- Change in Material Properties - Ozone Exposure
- Change in Material Properties - Thermal Exposure
- Change in Material Properties - Ultraviolet Exposure
- Cracking - Ozone Exposure
- Cracking - SCC/IGA
- Cracking - Thermal Exposure

- Cracking - Ultraviolet Exposure
- Loss of Material - Crevice Corrosion
- Loss of Material - Fouling
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - MIC
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the CW System components:

- Bolting Integrity Program
- External Surfaces Monitoring Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program
- One-Time Inspection Program
- Open-Cycle Cooling Water System Program
- Selective Leaching of Materials Program
- Water Chemistry Program

3.4.2.1.4 Condensate System

Materials

The materials of construction for the CD System components are:

- Brass
- Bronze
- Carbon Steel
- Cast Austenitic Stainless Steel
- Cast Iron
- Ductile Iron
- Glass
- Natural Rubber

- Stainless Steel

Environment

The CD System components are exposed to the following environments:

- Dry/Filtered Instrument Air (Internal)
- Outdoor Air - Sheltered (External)
- Plant Indoor Air - Uncontrolled (External)
- Steam (Internal)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the CD System, require management:

- Change in Material Properties - Ozone Exposure
- Change in Material Properties - Thermal Exposure
- Change in Material Properties - Ultraviolet Exposure
- Cracking - Ozone Exposure
- Cracking - SCC/IGA
- Cracking - Thermal Exposure
- Cracking - Ultraviolet Exposure
- Loss of Material - Crevice Corrosion
- Loss of Material - FAC
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the CD System components:

- Aboveground Steel Tanks Program
- Bolting Integrity Program
- External Surfaces Monitoring Program

- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Selective Leaching of Materials Program
- Water Chemistry Program

3.4.2.1.5 Feedwater System

Materials

The materials of construction for the FW System components are:

- Brass
- Carbon Steel
- Cast Iron
- Copper Alloy
- Stainless Steel

Environment

The FW System components are exposed to the following environments:

- Lubricating Oil (Internal)
- Plant Indoor Air - Uncontrolled (External)
- Primary Containment Air (External)
- Raw Water (Internal)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the FW System, require management:

- Cracking - SCC/IGA
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - FAC
- Loss of Material - Fouling
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion

- Loss of Material - MIC
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the FW System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- External Surfaces Monitoring Program
- Flow-Accelerated Corrosion Program
- Lubricating Oil Analysis Program
- One-Time Inspection Program
- Open-Cycle Cooling Water System Program
- Selective Leaching of Materials Program
- Water Chemistry Program

3.4.2.1.6 Main Steam System

Materials

The materials of construction for the MS System components are:

- Carbon Steel
- Cast Iron
- Stainless Steel

Environment

The MS System components are exposed to the following environments:

- Outdoor Air - Not Sheltered (External)
- Plant Indoor Air - Uncontrolled (External)
- Primary Containment Air (External)
- Steam (Internal)
- Treated Water (Internal)
- Wet Air/Gas (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the MS System, require management:

- Cracking - SCC/IGA
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - FAC
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the MS System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- External Surfaces Monitoring Program
- Flow-Accelerated Corrosion Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program
- One-Time Inspection Program
- Selective Leaching of Materials Program
- Water Chemistry Program

3.4.2.1.7 Steam Generator Blowdown System

Materials

The materials of construction for the SB System components are:

- Carbon Steel
- Copper Alloy
- Stainless Steel

Environment

The SB System components are exposed to the following environments:

- Plant Indoor Air-Uncontrolled (External)
- Primary Containment Air (External)
- Raw Water (Internal)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the SB System, require management:

- Cracking - SCC/IGA
- Loss of Material - Boric Acid Wastage
- Loss of Material - Crevice Corrosion
- Loss of Material - FAC
- Loss of Material - Fouling
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - MIC
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the SB System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- External Surfaces Monitoring Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Open-Cycle Cooling Water System Program
- Selective Leaching of Materials Program
- Water Chemistry Program

3.4.2.1.8 Turbine Generator and Support System

Materials

The materials of construction for the TB System components are:

- Aluminum
- Brass
- Bronze
- Carbon Steel
- Cast Iron
- Chrome-molybdenum Alloy
- Copper-Nickel
- Ductile Iron
- Glass
- Stainless Steel

Environment

The TB System components are exposed to the following environments:

- Wet Air/Gas (Internal)
- Hydraulic Oil (Internal)
- Hydrogen Gas (External)
- Lubricating Oil (Internal)
- Plant Indoor Air - Uncontrolled (External)
- Raw Water (Internal)
- Steam (Internal)
- Treated Water (Internal)

Aging Effects Requiring Management

The following aging effects, associated with the TB System, require management:

- Cracking - SCC/IGA
- Loss of Material - Boric Acid Corrosion
- Loss of Material - Crevice Corrosion
- Loss of Material - FAC

- Loss of Material - Fouling
- Loss of Material - Galvanic Corrosion
- Loss of Material - General Corrosion
- Loss of Material - MIC
- Loss of Material - Pitting Corrosion
- Loss of Material - Selective Leaching
- Loss of Preload - Thermal, Gasket Creep, Loosening

Aging Management Programs

The following AMPs manage the aging effects for the TB System components:

- Bolting Integrity Program
- Boric Acid Corrosion Program
- External Surfaces Monitoring Program
- Flow-Accelerated Corrosion Program
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program
- Lubricating Oil Analysis Program
- One-Time Inspection Program
- Open-Cycle Cooling Water System Program
- Selective Leaching of Materials Program
- Water Chemistry Program

3.4.2.2 Further Evaluation of Aging Management as Recommended by NUREG-1801

NUREG-1801 provides the basis for identifying those programs that warrant further evaluation by the reviewer in the LRA. For the Steam and Power Conversion System, those programs are addressed in the following sections.

3.4.2.2.1 Cumulative Fatigue Damage

Fatigue of metal components in steam and power conversion systems is a TLAA as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). These TLAAs are addressed in Section 4.3 of the LRA.

3.4.2.2.2 Loss of Material due to General, Pitting, and Crevice Corrosion

1. PART I

   Loss of material due to general, pitting, and crevice corrosion could occur for steel piping, piping components, piping elements exposed to steam. This aging effect is managed by the Water Chemistry Program and the One-Time Inspection Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.

   PART II

   Loss of material due to general, pitting, and crevice corrosion could occur for steel heat exchanger components exposed to treated water. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.

   PART III

   Loss of material due to general, pitting, and crevice corrosion could occur for steel piping, piping components, and piping elements exposed to treated water. This aging effect is managed with a combination of the

Water Chemistry Program and the One-Time Inspection Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.

2. Loss of material due to general, pitting and crevice corrosion could occur for steel piping, piping components, and piping elements exposed to lubricating oil. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. The Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results. The program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. Components containing hydraulic fluid and not lubricating oil are also managed by the Lubricating Oil Analysis Program and the One-Time Inspection Program. These programs assure the intended function of affected components will be maintained during the period of extended operation. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.

3.4.2.2.3 Loss of Material due to General, Pitting, Crevice, and Microbiologically-Influenced Corrosion, and Fouling

Loss of material due to general, pitting, crevice, and microbiologically-influenced corrosion, and fouling could occur in steel piping, piping components, and piping elements exposed to raw water. This aging effect is managed with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program. The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program performs internal inspections during scheduled preventive and corrective maintenance activities, or during other routinely scheduled tasks such as surveillance procedures, when the surfaces are made accessible for visual inspection. These inspections are performed to provide assurance that existing environmental conditions are not causing degradation. This program assures the intended function of affected components will be maintained during the period of extended operation.

3.4.2.2.4 Reduction of Heat Transfer due to Fouling

1. Reduction of heat transfer due to fouling could occur for stainless steel and copper alloy heat exchanger tubes exposed to treated water. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation.

2. Reduction of heat transfer due to fouling could occur for steel, stainless steel, and copper alloy heat exchanger tubes exposed to lubricating oil. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. The Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results. The program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. Components containing hydraulic fluid and not lubricating oil are also managed by the Lubricating Oil Analysis Program and the One-Time Inspection Program. These programs assure the intended function of affected components will be maintained during the period of extended operation.

3.4.2.2.5 Loss of Material due to General, Pitting, Crevice, and Microbiologically-Influenced Corrosion

1. Loss of material due to general, pitting, crevice, and microbiologically-influenced corrosion could occur for buried steel piping, piping components, piping elements, and tanks (with or without coating or wrapping) exposed to soil. Components in a buried environment are evaluated the same as a raw water environment at PINGP. This aging effect is managed with the Buried Piping and Tanks Inspection Program. The Buried Piping and Tanks Inspection Program includes preventive measures to mitigate degradation (e.g., coatings and wrappings required by design) and visual inspections of external surfaces of buried piping components, when excavated, for evidence of coating damage and degradation. The inspections either verify that unacceptable degradation is not occurring or trigger additional actions. This program assures the intended function of affected components will be maintained during the period of extended operation.

2. Loss of material due to general, pitting, crevice, and microbiologically-influenced corrosion could occur for steel heat exchanger components exposed to lubricating oil. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. The Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results. The program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. Components containing hydraulic fluid and not lubricating oil are also managed by the Lubricating Oil Analysis Program and the One-Time Inspection Program. These programs assure the intended function of affected components will be maintained during the period of extended operation. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.

3.4.2.2.6 Cracking due to Stress Corrosion Cracking (SCC)

Cracking due to stress corrosion cracking could occur in stainless steel piping, piping components, and piping elements, tanks, and heat exchanger components exposed to steam or treated water greater than >60°C (>140°F).

This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation.

3.4.2.2.7 **Loss of Material due to Pitting and Crevice Corrosion**

1. PART I

   Loss of material due to general (steel only) pitting and crevice corrosion could occur for steel and stainless steel tanks exposed to treated water. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.

   PART II

   Loss of material due to pitting and crevice corrosion could occur for aluminum and copper alloy piping, piping components, and piping elements exposed to treated water. This aging effect is managed with the Water Chemistry Program, One-Time Inspection Program, Closed-Cycle Cooling Water System Program, or the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. The Closed-Cycle Cooling Water System Program includes preventive measures (corrosion inhibitor addition and chemical testing) to minimize aging effects and component inspections to monitor for the effects of aging. In addition, cleaning and inspections of heat exchangers are performed periodically along with pump and heat exchanger performance/functional testing. The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program performs internal inspections during scheduled preventive and corrective maintenance activities, or during other routinely scheduled tasks such as surveillance procedures, when the surfaces are made accessible for visual inspection. These inspections are performed to provide assurance that existing environmental conditions are not causing degradation. These programs assure the intended function of affected components will be maintained during the period of extended operation.

PART III

Loss of material due to pitting and crevice corrosion could occur for stainless steel piping, piping components, and piping elements; tanks, and heat exchanger components exposed to treated water. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. The Water Chemistry Program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. The program controls concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. These programs assure the intended function of affected components will be maintained during the period of extended operation.

2. Loss of material due to pitting and crevice corrosion could occur for stainless steel piping, piping components, and piping elements exposed to

soil. PINGP does not have stainless steel components exposed to soil in NUREG-1801 Chapter VIII systems.

3. Loss of material due to pitting and crevice corrosion could occur for copper alloy piping, piping components, and piping elements exposed to lubricating oil. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. The Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results. The program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. Components containing hydraulic fluid and not lubricating oil are also managed by the Lubricating Oil Analysis Program and the One-Time Inspection Program. These programs assure the intended function of affected components will be maintained during the period of extended operation. PINGP added loss of material due to galvanic corrosion as an AERM for this line item.

3.4.2.2.8 Loss of Material due to Pitting, Crevice, and Microbiologically-Influenced Corrosion

Loss of material due to pitting, crevice, and microbiologically-influenced corrosion could occur for stainless steel piping, piping components, heat exchanger components and tanks exposed to lubricating oil. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. The Lubricating Oil Analysis Program includes periodic oil sampling, analysis, and evaluation and trending of results. The program maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to degradation. The One-Time Inspection Program performs sampling inspections using nondestructive examination techniques that either verify unacceptable degradation is not occurring or trigger additional actions. Components containing hydraulic fluid and not lubricating oil are also managed by the Lubricating Oil Analysis Program and the One-Time Inspection Program. These programs assure the intended function of affected components will be maintained during the period of extended operation.

3.4.2.2.9 Loss of Material due to General, Pitting, Crevice, and Galvanic Corrosion

Loss of material due to general, pitting, crevice, and galvanic corrosion could occur for steel heat exchanger components exposed to treated water. NUREG-1800 and NUREG-1801 identify this line item as applicable to BWRs only. However, this line item is applicable to both BWRs and PWRs for the Condensate System. PINGP used line item 3.4.1-03 for this evaluation.

3.4.2.3 Time-Limited Aging Analyses

The TLAAs identified below are associated with the Steam and Power Conversion System components. The section of the LRA that contains the TLAA review results is indicated in parenthesis.

- Metal Fatigue (Section 4.3)
- Probability of Damage to Safeguards Equipment from Turbine Missiles (Section 4.7.5)

3.4.3 Conclusion

The Steam and Power Conversion System piping, fittings, and components that are subject to an AMR have been identified in accordance with the requirements of 10 CFR 54.4. The AMPs selected to manage aging effects for the Steam and Power Conversion System components are identified in the summary tables and Section 3.4.2.1.

A description of these AMPs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation.

Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the Steam and Power Conversion System components will be adequately managed so that there is reasonable assurance that the intended function(s) will be maintained consistent with the Current Licensing Basis during the period of extended operation.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1-01	Steel piping, piping components, and piping elements exposed to steam or treated water	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Fatigue of metal components in steam and power conversion systems is addressed as a TLAA. Further evaluation is documented in Section 3.4.2.2.1.
3.4.1-02	Steel piping, piping components, and piping elements exposed to steam	Loss of material due to general, pitting and crevice corrosion	Water Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. Aging effect is managed by the Water Chemistry Program and the One-Time Inspection Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item. Further evaluation is documented in Section 3.4.2.2.2.1 PART I
3.4.1-03	Steel heat exchanger components exposed to treated water	Loss of material due to general, pitting and crevice corrosion	Water Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. Aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item. Further evaluation is documented in Section 3.4.2.2.2.1 PART II.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1-04	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 exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. Aging effect is managed by the Water Chemistry Program and the One-Time Inspection Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item. Further evaluation is documented in Section 3.4.2.2.2.1 PART III.
3.4.1-05	Steel heat exchanger components exposed to treated water	Loss of material due to general, pitting, crevice, and galvanic corrosion	Water Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated	This line item is not used at PINGP. See line item 3.4.1-03. Further evaluation is documented in Section 3.4.2.2.9.
3.4.1-06	Steel and stainless steel tanks exposed to treated water	Loss of material due to general (steel only) pitting and crevice corrosion	Water Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801 with exceptions. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. PINGP added loss of material due to galvanic corrosion for steel tanks for this line item. Further evaluation is documented in Section 3.4.2.2.7.1.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1-07	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	Consistent with NUREG-1801. Aging effect is managed with a combination of the Lubricating Oil Analysis Program and One-Time Inspection Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item. Further evaluation is documented in Section 3.4.2.2.2.2.
3.4.1-08	Steel piping, piping components, and piping elements exposed to raw water	Loss of material due to general, pitting, crevice, and microbiologically- influenced corrosion, and fouling	Plant specific	Yes, plant specific	Loss of material due to general, pitting, crevice, and microbiologically-influenced corrosion, and fouling could occur for steel piping, piping components, and piping elements exposed to raw water. This aging effect is managed with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program. Further evaluation is documented in Section 3.4.2.2.3.
3.4.1-09	Stainless steel and copper alloy heat exchanger tubes exposed to treated water	Reduction of heat transfer due to fouling	Water Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801 with exceptions. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. Further evaluation is documented in Section 3.4.2.2.4.1.
3.4.1-10	Steel, stainless steel, and copper alloy heat exchanger tubes exposed to lubricating oil	Reduction of heat transfer due to fouling	Lubricating Oil Analysis and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. Further evaluation is documented in Section 3.4.2.2.4.2.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1-11	Buried steel piping, piping components, piping elements, and tanks (with or without coating or wrapping) exposed to soil	Loss of material due to general, pitting, crevice, and microbiologically- influenced corrosion	Buried Piping and Tanks Surveillance or Buried Piping and Tanks Inspection	No Yes, detection of aging effects and operating experience are to be further evaluated	This AMP is not applicable at PINGP. PINGP credits the Buried Piping and Tanks Inspection Program for managing this aging effect. Consistent with NUREG1801. This aging effect is managed with the Buried Piping and Tanks Inspection Program. Further evaluation is documented in Section 3.4.2.2.5.1.
3.4.1-12	Steel heat exchanger components exposed to lubricating oil	Loss of material due to general, pitting, crevice, and microbiologically- influenced corrosion	Lubricating Oil Analysis and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG1801. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item. Further evaluation is documented in Section 3.4.2.2.5.2.
3.4.1-13	BWR Only				
3.4.1-14	Stainless steel piping, piping components, piping elements, tanks, and heat exchanger components exposed to treated water >60°C (>140°F)	Cracking due to stress corrosion cracking	Water Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801 with exceptions. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. Further evaluation is documented in Section 3.4.2.2.6.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1-15	Aluminum and copper alloy piping, piping components, and piping elements exposed to treated water	Loss of material due to pitting and crevice corrosion	Water Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801 with exceptions. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation and Closed-Cycle Cooling Water System Program implementation. This aging effect is managed by the Water Chemistry Program, One-Time Inspection Program, Closed-Cycle Cooling Water System Program or the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program. Further evaluation is documented in Section 3.4.2.2.7.1.
3.4.1-16	Stainless steel piping, piping components, and piping elements; tanks, and heat exchanger components exposed to treated water	Loss of material due to pitting and crevice corrosion	Water Chemistry and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801 with exceptions. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed with a combination of the Water Chemistry Program and the One-Time Inspection Program. Further evaluation is documented in Section 3.4.2.2.7.1.
3.4.1-17	Stainless steel piping, piping components, and piping elements exposed to soil	Loss of material due to pitting and crevice corrosion	Plant specific	Yes, plant specific	This line item is not applicable at PINGP. PINGP does not have stainless steel piping, piping components, and piping elements exposed to soil in NUREG-1801 Chapter VIII systems. Further evaluation is documented in Section 3.4.2.2.7.2.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1-18	Copper alloy piping, piping components, and piping elements exposed to lubricating oil	Loss of material due to pitting and crevice corrosion	Lubricating Oil Analysis and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. PINGP added loss of material due to galvanic corrosion as an AERM for this line item. Further evaluation is documented in Section 3.4.2.2.7.3.
3.4.1-19	Stainless steel piping, piping components, piping elements, and heat exchanger components exposed to lubricating oil	Loss of material due to pitting, crevice, and microbiologically-influenced corrosion	Lubricating Oil Analysis and One-Time Inspection	Yes, detection of aging effects is to be evaluated	Consistent with NUREG-1801. This aging effect is managed with a combination of the Lubricating Oil Analysis Program and the One-Time Inspection Program. Further evaluation is documented in Section 3.4.2.2.8.
3.4.1-20	Steel tanks exposed to air - outdoor (external)	Loss of material/ general, pitting, and crevice corrosion	Aboveground Steel Tanks	No	Consistent with NUREG-1801. This aging effect is managed with the Aboveground Steel Tanks Program.
3.4.1-21	High-strength steel closure bolting exposed to air with steam or water leakage	Cracking due to cyclic loading, stress corrosion cracking	Bolting Integrity	No	This line item is not applicable at PINGP. PINGP does not have high-strength steel closure bolting in NUREG-1801 Chapter VIII systems.
3.4.1-22	Steel bolting and closure bolting exposed to air with steam or water leakage, air - outdoor (external), or air - indoor uncontrolled (external);	Loss of material due to general, pitting and crevice corrosion; loss of preload due to thermal effects, gasket creep, and self-loosening	Bolting Integrity	No	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Bolting Integrity Program implementation. This aging effect is managed with the Bolting Integrity Program.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1-23	Stainless steel piping, piping components, and piping elements exposed to closed-cycle cooling water >60°C (>140°F)	Cracking due to stress corrosion cracking	Closed-Cycle Cooling Water System	No	This line item is not applicable at PINGP. PINGP does not contain stainless steel piping, piping components, and piping elements exposed to closed-cycle cooling water >60°C (>140°F) in NUREG-1801 Chapter VIII systems.
3.4.1-24	Steel heat exchanger components exposed to closed cycle cooling water	Loss of material due to general, pitting, crevice, and galvanic corrosion	Closed-Cycle Cooling Water System	No	This line item is not applicable at PINGP. PINGP does not have steel heat exchanger components exposed to closed-cycle cooling water in NUREG-1801 Chapter VIII.
3.4.1-25	Stainless steel piping, piping components, piping elements, and heat exchanger components exposed to closed cycle cooling water	Loss of material due to pitting and crevice corrosion	Closed-Cycle Cooling Water System	No	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Closed-Cycle Cooling Water System Program implementation. This aging effect is managed with the Closed-Cycle Cooling Water System Program.
3.4.1-26	Copper alloy piping, piping components, and piping elements exposed to closed cycle cooling water	Loss of material due to pitting, crevice, and galvanic corrosion	Closed-Cycle Cooling Water System	No	This line item is not applicable to PINGP. PINGP does not have copper alloy piping, piping components, and piping elements exposed to closed-cycle cooling water in NUREG-1801 Chapter VIII systems.
3.4.1-27	Steel, stainless steel, and copper alloy heat exchanger tubes exposed to closed cycle cooling water	Reduction of heat transfer due to fouling	Closed-Cycle Cooling Water System	No	This line item is not applicable to PINGP. PINGP does not have steel, stainless steel, and copper alloy heat exchanger tubes exposed to closed-cycle cooling water in NUREG-1801 Chapter VIII systems.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1-28	Steel external surfaces exposed to air - indoor uncontrolled (external), condensation (external), or air outdoor (external)	Loss of material due to general corrosion	External Surfaces Monitoring	No	Consistent with NUREG-1801. This aging effect is managed with the External Surfaces Monitoring Program or the Aboveground Steel Tanks Program.
3.4.1-29	Steel piping, piping components, and piping elements exposed to steam or treated water	Wall thinning due to flow-accelerated corrosion	Flow-Accelerated Corrosion	No	Consistent with NUREG-1801. This aging effect is managed with the Flow-Accelerated Corrosion Program.
3.4.1-30	Steel piping, piping components, and piping elements exposed to air outdoor (internal) or condensation (internal)	Loss of material due to general, pitting, and crevice corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components	No	Consistent with NUREG-1801. This aging effect is managed with the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program.
3.4.1-31	Steel heat exchanger components exposed to raw water	Loss of material due to general, pitting, crevice, galvanic, and microbiologically- influenced corrosion, and fouling	Open-Cycle Cooling Water System	No	Consistent with NUREG-1801. This aging effect is managed with the Open-Cycle Cooling Water System Program.
3.4.1-32	Stainless steel and copper alloy piping, piping components, and piping elements exposed to raw water	Loss of material due to pitting, crevice, and microbiologically- influenced corrosion	Open-Cycle Cooling Water System	No	Consistent with NUREG-1801. This aging effect is managed with the Open-Cycle Cooling Water System Program or the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program.
3.4.1-33	Stainless steel heat exchanger components exposed to raw water	Loss of material due to pitting, crevice, and microbiologically- influenced corrosion, and fouling	Open-Cycle Cooling Water System	No	Consistent with NUREG-1801. This aging effect is managed with the Open-Cycle Cooling Water System Program or the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1-34	Steel, stainless steel, and copper alloy heat exchanger tubes exposed to raw water	Reduction of heat transfer due to fouling	Open-Cycle Cooling Water System	No	This line item is not applicable to PINGP. PINGP does not have steel, stainless steel, and copper alloy heat exchanger tubes exposed to raw water in NUREG-1801 Chapter VIII systems.
3.4.1-35	Copper alloy >15% Zn piping, piping components, and piping elements exposed to closed cycle cooling water, raw water, or treated water	Loss of material due to selective leaching	Selective Leaching of Materials	No	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Selective Leaching of Materials Program implementation. This aging effect is managed with the by the Selective Leaching of Materials Program.
3.4.1-36	Gray cast iron piping, piping components, and piping elements exposed to soil, treated water, or raw water	Loss of material due to selective leaching	Selective Leaching of Materials	No	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Selective Leaching of Materials Program implementation. This aging effect is managed with the by the Selective Leaching of Materials Program.
3.4.1-37	Steel, stainless steel, and nickel-based alloy piping, piping components, and piping elements exposed to steam	Loss of material due to pitting and crevice corrosion	Water Chemistry	No	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed by the Water Chemistry Program. PINGP added loss of material due to galvanic corrosion for steel as an AERM for this line item.
3.4.1-38	Steel bolting and external surfaces exposed to air with borated water leakage	Loss of material due to boric acid corrosion	Boric Acid Corrosion	No	Consistent with NUREG-1801. This aging effect is managed with the Boric Acid Corrosion Program.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1-39	Stainless steel piping, piping components, and piping elements exposed to steam	Cracking due to stress corrosion cracking	Water Chemistry	No	Consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. This aging effect is managed with the Water Chemistry Program.
3.4.1-40	Glass piping elements exposed to air, lubricating oil, raw water, and treated water	None	None	NA - No AEM or AMP	Consistent with NUREG-1801.
3.4.1-41	Stainless steel, copper alloy, and nickel alloy piping, piping components, and piping elements exposed to air - indoor uncontrolled (external)	None	None	NA - No AEM or AMP	Consistent with NUREG-1801.
3.4.1-42	Steel piping, piping components, and piping elements exposed to air - indoor controlled (external)	None	None	NA - No AEM or AMP	This line item was not used at PINGP. PINGP did not credit an air - indoor controlled (external) environment for the evaluation of steel piping, piping components, and piping elements but rather evaluated these components in an air - indoor uncontrolled (external) environment.

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

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1-43	Steel and stainless steel piping, piping components, and piping elements in concrete	None	None	NA - No AEM or AMP	Further evaluation in Section 3.5.2.2.1.4 concluded that steel components in concrete are not susceptible to aging and do not require aging management. Based on this same rationale, steel and stainless steel piping, piping components, piping elements and miscellaneous structural components in concrete are not susceptible to aging and do not require aging management.
3.4.1-44	Steel, stainless steel, aluminum, and copper alloy piping, piping components, and piping elements exposed to gas	None	None	NA - No AEM or AMP	Consistent with NUREG-1801.

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-2	3.4.1-38	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VIII.H-4	3.4.1-22	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VIII.H-5	3.4.1-22	B, 404
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-2	3.4.1-38	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VIII.H-4	3.4.1-22	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VIII.H-5	3.4.1-22	B, 404.
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 404
			Primary Containment Air (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 404
Filter / Strainer Elements	Filter	Stainless Steel	Lubricating Oil (Ext)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-29	3.4.1-19	A
					One-Time Inspection Program	VIII.G-29	3.4.1-19	A

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Elements	Filter	Stainless Steel	Lubricating Oil (Ext)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-29	3.4.1-19	A
					One-Time Inspection Program	VIII.G-29	3.4.1-19	A
			Treated Water (Ext)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.G-32	3.4.1-16	A
					Water Chemistry Program	VIII.G-32	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.G-32	3.4.1-16	A
					Water Chemistry Program	VIII.G-32	3.4.1-16	B
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A
					Water Chemistry Program	VIII.G-38	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A, 410
					Water Chemistry Program	VIII.G-38	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A
					Water Chemistry Program	VIII.G-38	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A
					Water Chemistry Program	VIII.G-38	3.4.1-04	B

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Cast Iron	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 418
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Hydraulic Oil (Int)	Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A, 410
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A, 410
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
		Stainless Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-3	3.4.1-19	A
					One-Time Inspection Program	VIII.G-3	3.4.1-19	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-3	3.4.1-19	A
					One-Time Inspection Program	VIII.G-3	3.4.1-19	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	C
			Treated Water (Ext)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-36	3.4.1-16	A
					Water Chemistry Program	VIII.E-36	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-36	3.4.1-16	A
					Water Chemistry Program	VIII.E-36	3.4.1-16	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-36	3.4.1-16	A
					Water Chemistry Program	VIII.E-36	3.4.1-16	B

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-36	3.4.1-16	A
					Water Chemistry Program	VIII.E-36	3.4.1-16	B
Heat Exchanger Tubes	Heat Transfer	Copper Alloy	Hydraulic Oil (Ext)	Heat Transfer Degradation - Fouling	Lubricating Oil Analysis Program	VIII.G-8	3.4.1-10	A
					One-Time Inspection Program	VIII.G-8	3.4.1-10	A
			Lubricating Oil (Ext)	Heat Transfer Degradation - Fouling	Lubricating Oil Analysis Program	VIII.G-8	3.4.1-10	A
					One-Time Inspection Program	VIII.G-8	3.4.1-10	A
			Treated Water (Int)	Heat Transfer Degradation - Fouling	One-Time Inspection Program	VIII.G-10	3.4.1-09	A
					Water Chemistry Program	VIII.G-10	3.4.1-09	B
		Stainless Steel	Lubricating Oil (Ext)	Heat Transfer Degradation - Fouling	Lubricating Oil Analysis Program	VIII.G-12	3.4.1-10	A
					One-Time Inspection Program	VIII.G-12	3.4.1-10	A
			Treated Water (Int)	Heat Transfer Degradation - Fouling	One-Time Inspection Program	VIII.E-13	3.4.1-09	A
					Water Chemistry Program	VIII.E-13	3.4.1-09	B
	Pressure Boundary	Copper Alloy	Hydraulic Oil (Ext)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-19	3.4.1-18	C
					One-Time Inspection Program	VIII.G-19	3.4.1-18	C

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Copper Alloy	Hydraulic Oil (Ext)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-19	3.4.1-18	C
					One-Time Inspection Program	VIII.G-19	3.4.1-18	C
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 418
			Lubricating Oil (Ext)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VII.H2-10	3.3.1-26	C
					One-Time Inspection Program	VII.H2-10	3.3.1-26	C
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VII.H2-10	3.3.1-26	C
					One-Time Inspection Program	VII.H2-10	3.3.1-26	C
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 418
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-15	3.4.1-15	C
					Water Chemistry Program	VIII.F-15	3.4.1-15	D
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-15	3.4.1-15	C
					Water Chemistry Program	VIII.F-15	3.4.1-15	D
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.G-23	3.4.1-35	D

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Stainless Steel	Lubricating Oil (Ext)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-3	3.4.1-19	A
					One-Time Inspection Program	VIII.G-3	3.4.1-19	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-3	3.4.1-19	A
					One-Time Inspection Program	VIII.G-3	3.4.1-19	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-36	3.4.1-16	A
					Water Chemistry Program	VIII.E-36	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-36	3.4.1-16	A
					Water Chemistry Program	VIII.E-36	3.4.1-16	B
Manifolds	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.G-32	3.4.1-16	A
					Water Chemistry Program	VIII.G-32	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.G-32	3.4.1-16	A
					Water Chemistry Program	VIII.G-32	3.4.1-16	B

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A
					Water Chemistry Program	VIII.G-38	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A, 410
					Water Chemistry Program	VIII.G-38	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A
					Water Chemistry Program	VIII.G-38	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A
					Water Chemistry Program	VIII.G-38	3.4.1-04	B
		Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-15	3.4.1-15	A
					Water Chemistry Program	VIII.F-15	3.4.1-15	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-15	3.4.1-15	A
					Water Chemistry Program	VIII.F-15	3.4.1-15	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.G-23	3.4.1-35	B

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Primary Containment Air (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.G-32	3.4.1-16	A
					Water Chemistry Program	VIII.G-32	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.G-32	3.4.1-16	A
					Water Chemistry Program	VIII.G-32	3.4.1-16	B
Pump Casings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A
					Water Chemistry Program	VIII.G-38	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A, 410
					Water Chemistry Program	VIII.G-38	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A
					Water Chemistry Program	VIII.G-38	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A
					Water Chemistry Program	VIII.G-38	3.4.1-04	B

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Cast Iron	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 418
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
Restricting Orifices	Pressure Boundary	Stainless Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-29	3.4.1-19	A
					One-Time Inspection Program	VIII.G-29	3.4.1-19	A

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Restricting Orifices	Pressure Boundary	Stainless Steel	Lubricating Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-29	3.4.1-19	A
					One-Time Inspection Program	VIII.G-29	3.4.1-19	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.G-32	3.4.1-16	A
					Water Chemistry Program	VIII.G-32	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.G-32	3.4.1-16	A
					Water Chemistry Program	VIII.G-32	3.4.1-16	B
	Throttle	Stainless Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-29	3.4.1-19	A
					One-Time Inspection Program	VIII.G-29	3.4.1-19	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-29	3.4.1-19	A
					One-Time Inspection Program	VIII.G-29	3.4.1-19	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	C
					One-Time Inspection Program	VIII.G-35	3.4.1-07	C
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	C, 410
					One-Time Inspection Program	VIII.G-35	3.4.1-07	C, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	C
					One-Time Inspection Program	VIII.G-35	3.4.1-07	C
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	C
					One-Time Inspection Program	VIII.G-35	3.4.1-07	C
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
Thermowells	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A
					Water Chemistry Program	VIII.G-38	3.4.1-04	B

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A, 410
					Water Chemistry Program	VIII.G-38	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A
					Water Chemistry Program	VIII.G-38	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A
					Water Chemistry Program	VIII.G-38	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.G-32	3.4.1-16	A
					Water Chemistry Program	VIII.G-32	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.G-32	3.4.1-16	A
					Water Chemistry Program	VIII.G-32	3.4.1-16	B
Turbine Casings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-34	3.4.1-30	A

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Turbine Casings	Pressure Boundary	Carbon Steel	Wet Air/Gas (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-34	3.4.1-30	A
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-34	3.4.1-30	A
Valve Bodies	Pressure Boundary	Bronze	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-19	3.4.1-18	A
					One-Time Inspection Program	VIII.G-19	3.4.1-18	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-19	3.4.1-18	A
					One-Time Inspection Program	VIII.G-19	3.4.1-18	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 418
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-15	3.4.1-15	A
					Water Chemistry Program	VIII.F-15	3.4.1-15	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-15	3.4.1-15	A
					Water Chemistry Program	VIII.F-15	3.4.1-15	B

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Bronze	Treated Water (Int)	Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.G-23	3.4.1-35	B
		Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-35	3.4.1-07	A
					One-Time Inspection Program	VIII.G-35	3.4.1-07	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A

Table 3.4.2-1 Steam and Power Conversion System - Auxiliary Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A
					Water Chemistry Program	VIII.G-38	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A, 410
					Water Chemistry Program	VIII.G-38	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A
					Water Chemistry Program	VIII.G-38	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.G-38	3.4.1-04	A
					Water Chemistry Program	VIII.G-38	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.G-32	3.4.1-16	A
					Water Chemistry Program	VIII.G-32	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.G-32	3.4.1-16	A
					Water Chemistry Program	VIII.G-32	3.4.1-16	B

Table 3.4.2-2 Steam and Power Conversion System - Bleed Steam System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	Bolting Integrity Program	VIII.H-4	3.4.1-22	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VIII.H-5	3.4.1-22	B, 404
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 404
Manifolds	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 410
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A

Table 3.4.2-2 Steam and Power Conversion System - Bleed Steam System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Stainless Steel	Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.C-2	3.4.1-14	A
					Water Chemistry Program	VIII.C-2	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B
Piping / Fittings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Steam (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VIII.B1-10	3.4.1-01	A
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.C-5	3.4.1-29	A
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A, 410
					Water Chemistry Program	VIII.C-4	3.4.1-02	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B

Table 3.4.2-2 Steam and Power Conversion System - Bleed Steam System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Steam (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
			Treated Water (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VIII.B1-10	3.4.1-01	A
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.E-35	3.4.1-29	A
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 410
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
		Chrome-molybdenum Alloy	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Steam (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)			H

Table 3.4.2-2 Steam and Power Conversion System - Bleed Steam System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Chrome-molybdenum Alloy	Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A, 410
					Water Chemistry Program	VIII.C-4	3.4.1-02	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.A-10	3.4.1-39	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)			H
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.C-2	3.4.1-14	A
					Water Chemistry Program	VIII.C-2	3.4.1-14	B

Table 3.4.2-2 Steam and Power Conversion System - Bleed Steam System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Treated Water (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)			H
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-1	3.4.1-16	A
					Water Chemistry Program	VIII.C-1	3.4.1-16	B
Restricting Orifices	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A, 410
					Water Chemistry Program	VIII.C-4	3.4.1-02	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A

Table 3.4.2-2 Steam and Power Conversion System - Bleed Steam System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Restricting Orifices	Pressure Boundary	Stainless Steel	Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.A-10	3.4.1-39	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
Thermowells	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A, 410
					Water Chemistry Program	VIII.C-4	3.4.1-02	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.A-10	3.4.1-39	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B

Table 3.4.2-2 Steam and Power Conversion System - Bleed Steam System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Stainless Steel	Steam (Int)	Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
Valve Bodies	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.C-5	3.4.1-29	A
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A, 410
					Water Chemistry Program	VIII.C-4	3.4.1-02	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.E-35	3.4.1-29	A

Table 3.4.2-2 Steam and Power Conversion System - Bleed Steam System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A, 410
					Water Chemistry Program	VIII.C-7	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-7	3.4.1-04	A
					Water Chemistry Program	VIII.C-7	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.A-10	3.4.1-39	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B

Table 3.4.2-3 Steam and Power Conversion System - Circulating Water System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	Bolting Integrity Program	VIII.H-4	3.4.1-22	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VIII.H-5	3.4.1-22	B, 404
Eductors	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 410
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A, 410
					Water Chemistry Program	VIII.C-4	3.4.1-02	B, 410

Table 3.4.2-3 Steam and Power Conversion System - Circulating Water System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Eductors	Pressure Boundary	Carbon Steel	Steam (Int)	Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
		Cast Austenitic Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VIII.E-27	3.4.1-32	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VIII.E-27	3.4.1-32	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VIII.E-27	3.4.1-32	A
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.B1-2	3.4.1-39	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.B1-3	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.B1-3	3.4.1-37	B

Table 3.4.2-3 Steam and Power Conversion System - Circulating Water System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Expansion Joints	Pressure Boundary	Natural Rubber	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
			Raw Water (Int)	Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program			H, 423
				Cracking - Thermal Exposure	External Surfaces Monitoring Program			H, 423
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 410

Table 3.4.2-3 Steam and Power Conversion System - Circulating Water System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
Manifolds	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A

Table 3.4.2-3 Steam and Power Conversion System - Circulating Water System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 410
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
Piping / Fittings	Pressure Boundary	Bronze	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VIII.E-18	3.4.1-32	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VIII.E-18	3.4.1-32	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VIII.E-18	3.4.1-32	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.G-22	3.4.1-35	B
		Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A

Table 3.4.2-3 Steam and Power Conversion System - Circulating Water System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 410
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
		Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-18	3.4.1-32	E
					Open-Cycle Cooling Water System Program	VIII.E-18	3.4.1-32	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-18	3.4.1-32	E
					Open-Cycle Cooling Water System Program	VIII.E-18	3.4.1-32	A

Table 3.4.2-3 Steam and Power Conversion System - Circulating Water System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Copper Alloy	Raw Water (Int)	Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-18	3.4.1-32	E
					Open-Cycle Cooling Water System Program	VIII.E-18	3.4.1-32	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.G-22	3.4.1-35	B
		PVC	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program			F
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program			F
				Cracking - Ozone Exposure	External Surfaces Monitoring Program			F
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program			F
			Raw Water (Int)	None	None			F, 413
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VIII.E-27	3.4.1-32	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A

Table 3.4.2-3 Steam and Power Conversion System - Circulating Water System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - MIC	Open-Cycle Cooling Water System Program	VIII.E-27	3.4.1-32	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VIII.E-27	3.4.1-32	A
Pump Casings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 410
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
		Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 410

Table 3.4.2-3 Steam and Power Conversion System - Circulating Water System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Cast Iron	Raw Water (Int)	Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.G-24	3.4.1-36	B
Sight Glasses	Pressure Boundary	Glass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-5	3.4.1-40	A
			Raw Water (Int)	None	None	VIII.I-7	3.4.1-40	A
Tanks	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	C
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	C
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	C
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	C
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	C
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	C

Table 3.4.2-3 Steam and Power Conversion System - Circulating Water System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Brass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VIII.E-18	3.4.1-32	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VIII.E-18	3.4.1-32	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VIII.E-18	3.4.1-32	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.G-22	3.4.1-35	B
Valve Bodies	Pressure Boundary	Brass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VIII.E-18	3.4.1-32	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VIII.E-18	3.4.1-32	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VIII.E-18	3.4.1-32	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.G-22	3.4.1-35	B
		Bronze	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A

Table 3.4.2-3 Steam and Power Conversion System - Circulating Water System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Bronze	Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-18	3.4.1-32	E
					Open-Cycle Cooling Water System Program	VIII.E-18	3.4.1-32	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-18	3.4.1-32	E
					Open-Cycle Cooling Water System Program	VIII.E-18	3.4.1-32	A
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-18	3.4.1-32	E
					Open-Cycle Cooling Water System Program	VIII.E-18	3.4.1-32	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.G-22	3.4.1-35	B
		Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E

Table 3.4.2-3 Steam and Power Conversion System - Circulating Water System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E, 410
					Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 410
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
					Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
					Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
					Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A

Table 3.4.2-3 Steam and Power Conversion System - Circulating Water System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A, 410
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VII.C1-19	3.3.1-76	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.G-24	3.4.1-36	B
		PVC	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program			F
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program			F
				Cracking - Ozone Exposure	External Surfaces Monitoring Program			F
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program			F
			Raw Water (Int)	None	None			F, 413

Table 3.4.2-3 Steam and Power Conversion System - Circulating Water System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
					Open-Cycle Cooling Water System Program	VIII.E-27	3.4.1-32	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-15	3.3.1-79	A
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
					Open-Cycle Cooling Water System Program	VIII.E-27	3.4.1-32	A
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.H2-18	3.3.1-80	E
					Open-Cycle Cooling Water System Program	VIII.E-27	3.4.1-32	A

Table 3.4.2-4 Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Outdoor Air - Sheltered (Ext)	Loss of Material - General Corrosion	Bolting Integrity Program	VIII.H-1	3.4.1-22	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program			G, 404
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	Bolting Integrity Program	VIII.H-4	3.4.1-22	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VIII.H-5	3.4.1-22	B, 404
		Stainless Steel	Outdoor Air - Sheltered (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program			G, 404
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 404
Demineralizers	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 410
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 410

Table 3.4.2-4 Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Demineralizers	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
Expansion Joints	Pressure Boundary	Natural Rubber	Plant Indoor Air - Uncontrolled (Ext)	Change in Mat'l Properties - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Change in Mat'l Properties - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Ozone Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Thermal Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
				Cracking - Ultraviolet Exposure	External Surfaces Monitoring Program	VII.F4-6	3.3.1-11	E
			Treated Water (Int)	Change in Mat'l Properties - Thermal Exposure	External Surfaces Monitoring Program			H, 423
				Cracking - Thermal Exposure	External Surfaces Monitoring Program			H, 423

Table 3.4.2-4 Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 410
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
Flex Connections	Pressure Boundary	Stainless Steel	Outdoor Air - Sheltered (Ext)	None	None	VIII.I-10	3.4.1-41	G
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A

Table 3.4.2-4 Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 405
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 405
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 405, 410
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 405, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 405
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 405
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 405
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 405
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 410
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B

Table 3.4.2-4 Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 410
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.E-23	3.4.1-36	D
Manifolds	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 410
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 410

Table 3.4.2-4 Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.E-30	3.4.1-14	A
					Water Chemistry Program	VIII.E-30	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
Piping / Fittings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VIII.B1-10	3.4.1-01	A
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B

Table 3.4.2-4 Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.E-35	3.4.1-29	A
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 410
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
		Stainless Steel	Outdoor Air - Sheltered (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.E-30	3.4.1-14	A
					Water Chemistry Program	VIII.E-30	3.4.1-14	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)			H
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B

Table 3.4.2-4 Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
Pump Casings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 410
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
		Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 410
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 410

Table 3.4.2-4 Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Cast Iron	Treated Water (Int)	Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.E-23	3.4.1-36	B
		Ductile Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 410
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A

Table 3.4.2-4 Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
Restricting Orifices	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 410
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.E-30	3.4.1-14	A
					Water Chemistry Program	VIII.E-30	3.4.1-14	B

Table 3.4.2-4 Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Restricting Orifices	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
Sight Glasses	Pressure Boundary	Glass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-5	3.4.1-40	A
			Treated Water (Int)	None	None	VIII.I-8	3.4.1-40	A
Tanks	Pressure Boundary	Carbon Steel	Outdoor Air - Sheltered (Ext)	Loss of Material - General Corrosion	Aboveground Steel Tanks Program	VIII.E-39	3.4.1-20	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	Aboveground Steel Tanks Program	VIII.H-7	3.4.1-28	E
					External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A
					Water Chemistry Program	VIII.E-40	3.4.1-06	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A, 410
					Water Chemistry Program	VIII.E-40	3.4.1-06	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A
					Water Chemistry Program	VIII.E-40	3.4.1-06	B

Table 3.4.2-4 Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A
					Water Chemistry Program	VIII.E-40	3.4.1-06	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	C
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A
					Water Chemistry Program	VIII.E-40	3.4.1-06	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A
					Water Chemistry Program	VIII.E-40	3.4.1-06	B
Thermowells	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 410
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B

Table 3.4.2-4 Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.E-30	3.4.1-14	A
				Cracking - SCC/IGA	Water Chemistry Program	VIII.E-30	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
Valve Bodies	Pressure Boundary	Brass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-15	3.4.1-15	A
					Water Chemistry Program	VIII.F-15	3.4.1-15	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-15	3.4.1-15	A
					Water Chemistry Program	VIII.F-15	3.4.1-15	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.F-18	3.4.1-35	B
		Bronze	Dry/Filtered Instrument Air (Int)	None	None	VII.J-3	3.3.1-98	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A

Table 3.4.2-4 Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Bronze	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-15	3.4.1-15	A
					Water Chemistry Program	VIII.F-15	3.4.1-15	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-15	3.4.1-15	A
					Water Chemistry Program	VIII.F-15	3.4.1-15	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.F-18	3.4.1-35	B
		Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.E-35	3.4.1-29	A
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 410
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B

Table 3.4.2-4 Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Cast Austenitic Stainless Steel	Outdoor Air - Sheltered (Ext)	None	None	VIII.I-10	3.4.1-41	A, 419
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
		Ductile Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A, 410
					Water Chemistry Program	VIII.E-34	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-34	3.4.1-04	A
					Water Chemistry Program	VIII.E-34	3.4.1-04	B
		Stainless Steel	Outdoor Air - Sheltered (Ext)	None	None	VIII.I-10	3.4.1-41	A, 419

Table 3.4.2-4 Steam and Power Conversion System - Condensate System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.E-30	3.4.1-14	A
					Water Chemistry Program	VIII.E-30	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-29	3.4.1-16	A
					Water Chemistry Program	VIII.E-29	3.4.1-16	B

Table 3.4.2-5 Steam and Power Conversion System - Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-2	3.4.1-38	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VIII.H-4	3.4.1-22	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VIII.H-5	3.4.1-22	B, 404
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-2	3.4.1-38	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VIII.H-4	3.4.1-22	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VIII.H-5	3.4.1-22	B, 404
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 404
			Primary Containment Air (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 404
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	A
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.D1-6	3.4.1-07	A

Table 3.4.2-5 Steam and Power Conversion System - Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	A
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	A
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A, 410
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A

Table 3.4.2-5 Steam and Power Conversion System - Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.D1-9	3.4.1-29	C
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 410
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B
		Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A

Table 3.4.2-5 Steam and Power Conversion System - Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Cast Iron	Raw Water (Int)	Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.G-24	3.4.1-36	D
LEFM Transducer Housings	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.D1-5	3.4.1-14	A
					Water Chemistry Program	VIII.D1-5	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.D1-4	3.4.1-16	A
					Water Chemistry Program	VIII.D1-4	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.D1-4	3.4.1-16	A
					Water Chemistry Program	VIII.D1-4	3.4.1-16	B
Manifolds	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.D1-5	3.4.1-14	A
					Water Chemistry Program	VIII.D1-5	3.4.1-14	B

Table 3.4.2-5 Steam and Power Conversion System - Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.D1-4	3.4.1-16	A
					Water Chemistry Program	VIII.D1-4	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.D1-4	3.4.1-16	A
					Water Chemistry Program	VIII.D1-4	3.4.1-16	B
Piping / Fittings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	A
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	A
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	A
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A

Table 3.4.2-5 Steam and Power Conversion System - Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VIII.D1-7	3.4.1-01	A
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.D1-9	3.4.1-29	A
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A, 410
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B
		Copper Alloy	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.D1-2	3.4.1-18	A
					One-Time Inspection Program	VIII.D1-2	3.4.1-18	A

Table 3.4.2-5 Steam and Power Conversion System - Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Copper Alloy	Lubricating Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.D1-2	3.4.1-18	A
					One-Time Inspection Program	VIII.D1-2	3.4.1-18	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 418
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
		Stainless Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.D1-3	3.4.1-19	A
					One-Time Inspection Program	VIII.D1-3	3.4.1-19	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.D1-3	3.4.1-19	A
					One-Time Inspection Program	VIII.D1-3	3.4.1-19	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Primary Containment Air (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.D1-5	3.4.1-14	A
					Water Chemistry Program	VIII.D1-5	3.4.1-14	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)			H

Table 3.4.2-5 Steam and Power Conversion System - Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.D1-4	3.4.1-16	A
					Water Chemistry Program	VIII.D1-4	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.D1-4	3.4.1-16	A
					Water Chemistry Program	VIII.D1-4	3.4.1-16	B
Pump Casings	Pressure Boundary	Cast Iron	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	A
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	A
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	A
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 418
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A

Table 3.4.2-5 Steam and Power Conversion System - Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.D1-5	3.4.1-14	A
					Water Chemistry Program	VIII.D1-5	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.D1-4	3.4.1-16	A
					Water Chemistry Program	VIII.D1-4	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.D1-4	3.4.1-16	A
					Water Chemistry Program	VIII.D1-4	3.4.1-16	B
Restricting Orifices	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A, 410
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B

Table 3.4.2-5 Steam and Power Conversion System - Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Restricting Orifices	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.D1-5	3.4.1-14	A
					Water Chemistry Program	VIII.D1-5	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.D1-4	3.4.1-16	A
					Water Chemistry Program	VIII.D1-4	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.D1-4	3.4.1-16	A
					Water Chemistry Program	VIII.D1-4	3.4.1-16	B
Tanks	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	C
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	C
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	C, 410
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	C, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	C
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	C

Table 3.4.2-5 Steam and Power Conversion System - Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	C
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	C
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
Thermowells	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A, 410
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A

Table 3.4.2-5 Steam and Power Conversion System - Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Stainless Steel	Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.D1-5	3.4.1-14	A
					Water Chemistry Program	VIII.D1-5	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.D1-4	3.4.1-16	A
					Water Chemistry Program	VIII.D1-4	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.D1-4	3.4.1-16	A
					Water Chemistry Program	VIII.D1-4	3.4.1-16	B
Valve Bodies	Pressure Boundary	Brass	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.D1-2	3.4.1-18	A
					One-Time Inspection Program	VIII.D1-2	3.4.1-18	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.D1-2	3.4.1-18	A
					One-Time Inspection Program	VIII.D1-2	3.4.1-18	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 418
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
		Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	A
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	A

Table 3.4.2-5 Steam and Power Conversion System - Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	A
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.D1-6	3.4.1-07	A
					One-Time Inspection Program	VIII.D1-6	3.4.1-07	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.D1-9	3.4.1-29	A

Table 3.4.2-5 Steam and Power Conversion System - Feedwater System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A, 410
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.D1-8	3.4.1-04	A
					Water Chemistry Program	VIII.D1-8	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Primary Containment Air (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.D1-5	3.4.1-14	A
					Water Chemistry Program	VIII.D1-5	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.D1-4	3.4.1-16	A
					Water Chemistry Program	VIII.D1-4	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.D1-4	3.4.1-16	A
					Water Chemistry Program	VIII.D1-4	3.4.1-16	B

Table 3.4.2-6 Steam and Power Conversion System - Main Steam System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-2	3.4.1-38	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VIII.H-4	3.4.1-22	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VIII.H-5	3.4.1-22	B, 404
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 404
Manifolds	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.B1-2	3.4.1-39	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.B1-3	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.B1-3	3.4.1-37	B
Piping / Fittings	Pressure Boundary	Carbon Steel	Outdoor Air - Not Sheltered (Ext)	Loss of Material - Crevice Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A
				Loss of Material - Galvanic Corrosion	External Surfaces Monitoring Program	VIII.H-8	3.4.1-28	A, 410
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-8	3.4.1-28	A
				Loss of Material - Pitting Corrosion	External Surfaces Monitoring Program	VII.H1-8	3.3.1-60	A

Table 3.4.2-6 Steam and Power Conversion System - Main Steam System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Steam (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VIII.B1-10	3.4.1-01	A
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.B1-9	3.4.1-29	A
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A, 410
					Water Chemistry Program	VIII.C-4	3.4.1-02	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.B1-7	3.4.1-30	A

Table 3.4.2-6 Steam and Power Conversion System - Main Steam System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Wet Air/Gas (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.B1-7	3.4.1-30	A
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.B1-7	3.4.1-30	A
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.B1-2	3.4.1-39	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)			H
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.B1-3	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.B1-3	3.4.1-37	B
Restricting Orifices	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Primary Containment Air (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.B1-2	3.4.1-39	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.B1-3	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.B1-3	3.4.1-37	B

Table 3.4.2-6 Steam and Power Conversion System - Main Steam System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Restricting Orifices	Throttle	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Primary Containment Air (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.B1-2	3.4.1-39	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.B1-3	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.B1-3	3.4.1-37	B
Thermowells	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A, 410
					Water Chemistry Program	VIII.C-4	3.4.1-02	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B

Table 3.4.2-6 Steam and Power Conversion System - Main Steam System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.B1-2	3.4.1-39	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.B1-3	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.B1-3	3.4.1-37	B
Valve Bodies	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.B1-9	3.4.1-29	A
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A, 410
					Water Chemistry Program	VIII.C-4	3.4.1-02	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B

Table 3.4.2-6 Steam and Power Conversion System - Main Steam System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Steam (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.D1-9	3.4.1-29	A
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A, 410
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.B1-7	3.4.1-30	A
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.B1-7	3.4.1-30	A

Table 3.4.2-6 Steam and Power Conversion System - Main Steam System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Wet Air/Gas (Int)	Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.B1-7	3.4.1-30	A
		Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A, 410
					Water Chemistry Program	VIII.C-4	3.4.1-02	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.C-4	3.4.1-02	A
					Water Chemistry Program	VIII.C-4	3.4.1-02	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.A-8	3.4.1-36	B
			Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.B1-7	3.4.1-30	A

Table 3.4.2-6 Steam and Power Conversion System - Main Steam System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Cast Iron	Wet Air/Gas (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.B1-7	3.4.1-30	A
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.B1-7	3.4.1-30	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.A-8	3.4.1-36	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Primary Containment Air (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.B1-2	3.4.1-39	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.B1-3	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.B1-3	3.4.1-37	B

Table 3.4.2-7 Steam and Power Conversion System - Steam Generator Blowdown System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-2	3.4.1-38	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VIII.H-4	3.4.1-22	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VIII.H-5	3.4.1-22	B, 404
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-2	3.4.1-38	A
				Loss of Material - General Corrosion	Bolting Integrity Program	VIII.H-4	3.4.1-22	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VIII.H-5	3.4.1-22	B, 404
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 404
			Primary Containment Air (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 404
Expansion Joints	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.F-24	3.4.1-14	A
					Water Chemistry Program	VIII.F-24	3.4.1-14	B

Table 3.4.2-7 Steam and Power Conversion System - Steam Generator Blowdown System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Expansion Joints	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-23	3.4.1-16	A
					Water Chemistry Program	VIII.F-23	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-23	3.4.1-16	A
					Water Chemistry Program	VIII.F-23	3.4.1-16	B
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-25	3.4.1-04	A
					Water Chemistry Program	VIII.F-25	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.F-25	3.4.1-04	A, 410
					Water Chemistry Program	VIII.F-25	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.F-25	3.4.1-04	A
					Water Chemistry Program	VIII.F-25	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-25	3.4.1-04	A
					Water Chemistry Program	VIII.F-25	3.4.1-04	B

Table 3.4.2-7 Steam and Power Conversion System - Steam Generator Blowdown System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VIII.F-5	3.4.1-31	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VIII.F-5	3.4.1-31	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VIII.F-5	3.4.1-31	A
				Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VIII.F-5	3.4.1-31	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VIII.F-5	3.4.1-31	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VIII.F-5	3.4.1-31	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 410
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B

Table 3.4.2-7 Steam and Power Conversion System - Steam Generator Blowdown System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B
Manifolds	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.F-24	3.4.1-14	A
					Water Chemistry Program	VIII.F-24	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-23	3.4.1-16	A
					Water Chemistry Program	VIII.F-23	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-23	3.4.1-16	A
					Water Chemistry Program	VIII.F-23	3.4.1-16	B
Piping / Fittings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VIII.B1-10	3.4.1-01	A

Table 3.4.2-7 Steam and Power Conversion System - Steam Generator Blowdown System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-25	3.4.1-04	A
					Water Chemistry Program	VIII.F-25	3.4.1-04	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.F-26	3.4.1-29	A
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.F-25	3.4.1-04	A, 410
					Water Chemistry Program	VIII.F-25	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.F-25	3.4.1-04	A
					Water Chemistry Program	VIII.F-25	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-25	3.4.1-04	A
					Water Chemistry Program	VIII.F-25	3.4.1-04	B
		Copper Alloy	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
				Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VII.I-12	3.3.1-88	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-15	3.4.1-15	A
					Water Chemistry Program	VIII.F-15	3.4.1-15	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-15	3.4.1-15	A
					Water Chemistry Program	VIII.F-15	3.4.1-15	B

Table 3.4.2-7 Steam and Power Conversion System - Steam Generator Blowdown System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Copper Alloy	Treated Water (Int)	Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.G-23	3.4.1-35	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.F-24	3.4.1-14	A
					Water Chemistry Program	VIII.F-24	3.4.1-14	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)			H
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-23	3.4.1-16	A
					Water Chemistry Program	VIII.F-23	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-23	3.4.1-16	A
					Water Chemistry Program	VIII.F-23	3.4.1-16	B
Pump Casings	Pressure Boundary	Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.F-24	3.4.1-14	A
					Water Chemistry Program	VIII.F-24	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-23	3.4.1-16	A
					Water Chemistry Program	VIII.F-23	3.4.1-16	B

Table 3.4.2-7 Steam and Power Conversion System - Steam Generator Blowdown System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-23	3.4.1-16	A
					Water Chemistry Program	VIII.F-23	3.4.1-16	B
Tanks	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A
					Water Chemistry Program	VIII.E-40	3.4.1-06	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A, 410
					Water Chemistry Program	VIII.E-40	3.4.1-06	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A
					Water Chemistry Program	VIII.E-40	3.4.1-06	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-40	3.4.1-06	A
					Water Chemistry Program	VIII.E-40	3.4.1-06	B
Thermowells	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-25	3.4.1-04	A
					Water Chemistry Program	VIII.F-25	3.4.1-04	B

Table 3.4.2-7 Steam and Power Conversion System - Steam Generator Blowdown System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.F-25	3.4.1-04	A, 410
					Water Chemistry Program	VIII.F-25	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.F-25	3.4.1-04	A
					Water Chemistry Program	VIII.F-25	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-25	3.4.1-04	A
					Water Chemistry Program	VIII.F-25	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.F-24	3.4.1-14	A
					Water Chemistry Program	VIII.F-24	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-23	3.4.1-16	A
					Water Chemistry Program	VIII.F-23	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-23	3.4.1-16	A
					Water Chemistry Program	VIII.F-23	3.4.1-16	B
Valve Bodies	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A

Table 3.4.2-7 Steam and Power Conversion System - Steam Generator Blowdown System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Primary Containment Air (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-25	3.4.1-04	A
					Water Chemistry Program	VIII.F-25	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.F-25	3.4.1-04	A, 410
					Water Chemistry Program	VIII.F-25	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.F-25	3.4.1-04	A
					Water Chemistry Program	VIII.F-25	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-25	3.4.1-04	A
					Water Chemistry Program	VIII.F-25	3.4.1-04	B
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.F-24	3.4.1-14	A
					Water Chemistry Program	VIII.F-24	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.F-23	3.4.1-16	A
					Water Chemistry Program	VIII.F-23	3.4.1-16	B

Table 3.4.2-7 Steam and Power Conversion System - Steam Generator Blowdown System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.F-23	3.4.1-16	A
					Water Chemistry Program	VIII.F-23	3.4.1-16	B

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Blowers	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A, 410
					Water Chemistry Program	VIII.A-16	3.4.1-02	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B
Bolting / Fasteners	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	Bolting Integrity Program	VIII.H-4	3.4.1-22	B
				Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	VIII.H-5	3.4.1-22	B, 404
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Preload - Thermal, gasket creep, loosening	Bolting Integrity Program	IV.C2-8	3.1.1-52	B, 404

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Eductors	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A, 410
					Water Chemistry Program	VIII.A-16	3.4.1-02	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B
Filter / Strainer Housings	Pressure Boundary	Brass	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-3	3.4.1-18	A
					One-Time Inspection Program	VIII.A-3	3.4.1-18	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-3	3.4.1-18	A
					One-Time Inspection Program	VIII.A-3	3.4.1-18	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 418

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Brass	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
		Carbon Steel	Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A, 410

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Filter / Strainer Housings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.A-10	3.4.1-39	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
Flex Connections	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A, 410

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Flex Connections	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.B1-5	3.4.1-14	A
					Water Chemistry Program	VIII.B1-5	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4	3.4.1-16	B
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A, 410
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
					Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - Fouling	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
					Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E, 410
					Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
					Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
					Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
					Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	C
					Water Chemistry Program	VIII.A-16	3.4.1-02	D

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Carbon Steel	Steam (Int)	Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	C, 410
					Water Chemistry Program	VIII.A-16	3.4.1-02	D, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	C
					Water Chemistry Program	VIII.A-16	3.4.1-02	D
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	C
					Water Chemistry Program	VIII.A-16	3.4.1-02	D
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A, 410
					Water Chemistry Program	VIII.E-37	3.4.1-03	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.E-37	3.4.1-03	A
					Water Chemistry Program	VIII.E-37	3.4.1-03	B

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Cast Iron	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A, 410
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-6	3.4.1-12	A
					One-Time Inspection Program	VIII.G-6	3.4.1-12	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 418
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - Galvanic Corrosion	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Components	Pressure Boundary	Cast Iron	Raw Water (Int)	Loss of Material - General Corrosion	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.A-7	3.4.1-36	D
		Stainless Steel	Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.G-3	3.4.1-19	A
					One-Time Inspection Program	VIII.G-3	3.4.1-19	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.G-3	3.4.1-19	A
					One-Time Inspection Program	VIII.G-3	3.4.1-19	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	C
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Heat Exchanger Tubes	Pressure Boundary	Copper-Nickel	Hydrogen Gas (Ext)	None	None	VIII.I-3	3.4.1-44	C
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.A-4	3.4.1-32	E
				Loss of Material - Fouling	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.A-4	3.4.1-32	E, 401
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.A-4	3.4.1-32	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.A-4	3.4.1-32	E
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.A-6	3.4.1-35	D
Manifolds	Pressure Boundary	Carbon Steel	Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Carbon Steel	Hydraulic Oil (Int)	Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A, 410
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
		Stainless Steel	Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	A
					One-Time Inspection Program	VIII.A-9	3.4.1-19	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Manifolds	Pressure Boundary	Stainless Steel	Hydraulic Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	A
					One-Time Inspection Program	VIII.A-9	3.4.1-19	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	A
					One-Time Inspection Program	VIII.A-9	3.4.1-19	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	A
					One-Time Inspection Program	VIII.A-9	3.4.1-19	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.B1-5	3.4.1-14	A
					Water Chemistry Program	VIII.B1-5	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4	3.4.1-16	B

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Wet Air/Gas (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.B1-7	3.4.1-30	A
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.B1-7	3.4.1-30	A, 410
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.B1-7	3.4.1-30	A
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.B1-7	3.4.1-30	A
			Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Hydraulic Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
					Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	C
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	C
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E, 410
					Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	C
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
					Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	C
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
					Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	C

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
					Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	C
			Steam (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VIII.B1-10	3.4.1-01	A
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.A-17	3.4.1-29	A
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A, 410
					Water Chemistry Program	VIII.A-16	3.4.1-02	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B
			Treated Water (Int)	Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)	VIII.B1-10	3.4.1-01	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.B1-9	3.4.1-29	A, 405
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A, 410
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
		Stainless Steel	Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	A
					One-Time Inspection Program	VIII.A-9	3.4.1-19	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	A
					One-Time Inspection Program	VIII.A-9	3.4.1-19	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	A
					One-Time Inspection Program	VIII.A-9	3.4.1-19	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	A
					One-Time Inspection Program	VIII.A-9	3.4.1-19	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-27	3.4.1-32	E, 420
					Open-Cycle Cooling Water System Program	VIII.E-27	3.4.1-32	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	C
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-27	3.4.1-32	E, 420
					Open-Cycle Cooling Water System Program	VIII.E-27	3.4.1-32	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Piping / Fittings	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-27	3.4.1-32	E, 420
					Open-Cycle Cooling Water System Program	VIII.E-27	3.4.1-32	A
			Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.A-10	3.4.1-39	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)			H
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.B1-5	3.4.1-14	A
					Water Chemistry Program	VIII.B1-5	3.4.1-14	B
				Cumulative Fatigue Damage - Fatigue	TLAA (Section 4.3.2)			H
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4	3.4.1-16	B

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Aluminum	Plant Indoor Air - Uncontrolled (Ext)	None	None	V.F-2	3.2.1-50	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-15	3.4.1-15	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-15	3.4.1-15	E
		Carbon Steel	Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
		Ductile Iron	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A, 410

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Pump Casings	Pressure Boundary	Ductile Iron	Lubricating Oil (Int)	Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-27	3.4.1-32	E, 420
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-27	3.4.1-32	E, 420
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-27	3.4.1-32	E, 420
Restricting Orifices	Pressure Boundary	Carbon Steel	Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Restricting Orifices	Pressure Boundary	Carbon Steel	Hydraulic Oil (Int)	Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
		Stainless Steel	Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.A-10	3.4.1-39	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
Rupture Discs	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Rupture Discs	Pressure Boundary	Carbon Steel	Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A, 410
					Water Chemistry Program	VIII.A-16	3.4.1-02	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B
Sight Glasses	Pressure Boundary	Glass	Lubricating Oil (Int)	None	None	VIII.I-6	3.4.1-40	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-5	3.4.1-40	A
			Treated Water (Int)	None	None	VIII.I-8	3.4.1-40	A
Tanks	Pressure Boundary	Carbon Steel	Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	C
					One-Time Inspection Program	VIII.A-14	3.4.1-07	C
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	C, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	C, 410

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Carbon Steel	Hydraulic Oil (Int)	Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	C
					One-Time Inspection Program	VIII.A-14	3.4.1-07	C
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	C
					One-Time Inspection Program	VIII.A-14	3.4.1-07	C
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	C
					One-Time Inspection Program	VIII.A-14	3.4.1-07	C
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	C, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	C, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	C
					One-Time Inspection Program	VIII.A-14	3.4.1-07	C
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	C
					One-Time Inspection Program	VIII.A-14	3.4.1-07	C
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Tanks	Pressure Boundary	Stainless Steel	Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	C
					One-Time Inspection Program	VIII.A-9	3.4.1-19	C
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	C
					One-Time Inspection Program	VIII.A-9	3.4.1-19	C
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	C
Thermowells	Pressure Boundary	Carbon Steel	Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Carbon Steel	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
			Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A, 410
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B, 410

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - General Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
		Stainless Steel	Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	A
					One-Time Inspection Program	VIII.A-9	3.4.1-19	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	A
					One-Time Inspection Program	VIII.A-9	3.4.1-19	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	A
					One-Time Inspection Program	VIII.A-9	3.4.1-19	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	A
					One-Time Inspection Program	VIII.A-9	3.4.1-19	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Thermowells	Pressure Boundary	Stainless Steel	Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.A-10	3.4.1-39	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.B1-5	3.4.1-14	A
					Water Chemistry Program	VIII.B1-5	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4	3.4.1-16	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4	3.4.1-16	B
Traps	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A, 410
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B, 410

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Traps	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - General Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
		Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A, 410
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.A-8	3.4.1-36	B

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Traps	Pressure Boundary	Chrome-molybdenum Alloy	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A, 422
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A, 422
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A, 422
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B, 422
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A, 410, 422
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B, 410, 422
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A, 422
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B, 422
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A, 422
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B, 422
Turbine Casings	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	C
					Water Chemistry Program	VIII.A-16	3.4.1-02	D
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	C, 410
					Water Chemistry Program	VIII.A-16	3.4.1-02	D, 410

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Turbine Casings	Pressure Boundary	Carbon Steel	Steam (Int)	Loss of Material - General Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	C
					Water Chemistry Program	VIII.A-16	3.4.1-02	D
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	C
					Water Chemistry Program	VIII.A-16	3.4.1-02	D
Valve Bodies	Pressure Boundary	Brass	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-3	3.4.1-18	A
					One-Time Inspection Program	VIII.A-3	3.4.1-18	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-3	3.4.1-18	A
					One-Time Inspection Program	VIII.A-3	3.4.1-18	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 418
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.A-4	3.4.1-32	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.A-4	3.4.1-32	E

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Brass	Raw Water (Int)	Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.A-4	3.4.1-32	E
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.A-6	3.4.1-35	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.A-5	3.4.1-15	A
					Water Chemistry Program	VIII.A-5	3.4.1-15	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.A-5	3.4.1-15	A
					Water Chemistry Program	VIII.A-5	3.4.1-15	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.E-21	3.4.1-35	B
		Bronze	Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-3	3.4.1-18	A
					One-Time Inspection Program	VIII.A-3	3.4.1-18	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-3	3.4.1-18	A
					One-Time Inspection Program	VIII.A-3	3.4.1-18	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 418

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Bronze	Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-3	3.4.1-18	A
					One-Time Inspection Program	VIII.A-3	3.4.1-18	A
			Lubricating Oil (Int)	Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-3	3.4.1-18	A
					One-Time Inspection Program	VIII.A-3	3.4.1-18	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program			H, 418
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-2	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.A-4	3.4.1-32	E
					Open-Cycle Cooling Water System Program	VIII.A-4	3.4.1-32	A
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VII.C1-9	3.3.1-81	A
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.A-4	3.4.1-32	E
					Open-Cycle Cooling Water System Program	VIII.A-4	3.4.1-32	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Bronze	Raw Water (Int)	Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.A-4	3.4.1-32	E
					Open-Cycle Cooling Water System Program	VIII.A-4	3.4.1-32	A
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.A-6	3.4.1-35	B
			Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.A-5	3.4.1-15	A
					Water Chemistry Program	VIII.A-5	3.4.1-15	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.A-5	3.4.1-15	A
					Water Chemistry Program	VIII.A-5	3.4.1-15	B
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.E-21	3.4.1-35	B
		Carbon Steel	Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A, 410

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Hydraulic Oil (Int)	Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Galvanic Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A, 410
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A, 410
				Loss of Material - General Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-14	3.4.1-07	A
					One-Time Inspection Program	VIII.A-14	3.4.1-07	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - Boric Acid Wastage	Boric Acid Corrosion Program	VIII.H-9	3.4.1-38	A
				Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
					Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	C
				Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	C
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E, 410
					Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	C
				Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
					Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	C

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Raw Water (Int)	Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
					Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	C
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
					Open-Cycle Cooling Water System Program	VIII.E-6	3.4.1-31	C
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.A-17	3.4.1-29	A
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A, 410
					Water Chemistry Program	VIII.A-16	3.4.1-02	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Carbon Steel	Treated Water (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
				Loss of Material - FAC	Flow-Accelerated Corrosion Program	VIII.B1-9	3.4.1-29	A, 405
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A, 410
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-11	3.4.1-04	A
					Water Chemistry Program	VIII.B1-11	3.4.1-04	B
		Cast Iron	Plant Indoor Air - Uncontrolled (Ext)	Loss of Material - General Corrosion	External Surfaces Monitoring Program	VIII.H-7	3.4.1-28	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
				Loss of Material - Galvanic Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E, 410

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Cast Iron	Raw Water (Int)	Loss of Material - General Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.G-36	3.4.1-08	E
				Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.A-7	3.4.1-36	B
			Steam (Int)	Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B
				Loss of Material - Galvanic Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A, 410
					Water Chemistry Program	VIII.A-16	3.4.1-02	B, 410
				Loss of Material - General Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B
				Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.A-16	3.4.1-02	A
					Water Chemistry Program	VIII.A-16	3.4.1-02	B

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Cast Iron	Steam (Int)	Loss of Material - Selective Leaching	Selective Leaching of Materials Program	VIII.A-8	3.4.1-36	B, 405
		Stainless Steel	Hydraulic Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	A
					One-Time Inspection Program	VIII.A-9	3.4.1-19	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	A
					One-Time Inspection Program	VIII.A-9	3.4.1-19	A
			Lubricating Oil (Int)	Loss of Material - Crevice Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	A
					One-Time Inspection Program	VIII.A-9	3.4.1-19	A
				Loss of Material - Pitting Corrosion	Lubricating Oil Analysis Program	VIII.A-9	3.4.1-19	A
					One-Time Inspection Program	VIII.A-9	3.4.1-19	A
			Plant Indoor Air - Uncontrolled (Ext)	None	None	VIII.I-10	3.4.1-41	A
			Raw Water (Int)	Loss of Material - Crevice Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-27	3.4.1-32	E, 420
					Open-Cycle Cooling Water System Program	VIII.E-27	3.4.1-32	A

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Raw Water (Int)	Loss of Material - Fouling	Open-Cycle Cooling Water System Program	VIII.E-3	3.4.1-33	C
				Loss of Material - MIC	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-27	3.4.1-32	E, 420
				Loss of Material - MIC	Open-Cycle Cooling Water System Program	VIII.E-27	3.4.1-32	A
				Loss of Material - Pitting Corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VIII.E-27	3.4.1-32	E, 420
				Loss of Material - Pitting Corrosion	Open-Cycle Cooling Water System Program	VIII.E-27	3.4.1-32	A
			Steam (Int)	Cracking - SCC/IGA	Water Chemistry Program	VIII.A-10	3.4.1-39	B
				Loss of Material - Crevice Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
				Loss of Material - Pitting Corrosion	Water Chemistry Program	VIII.A-12	3.4.1-37	B
			Treated Water (Int)	Cracking - SCC/IGA	One-Time Inspection Program	VIII.B1-5	3.4.1-14	A
					Water Chemistry Program	VIII.B1-5	3.4.1-14	B
				Loss of Material - Crevice Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4	3.4.1-16	B

Table 3.4.2-8 Steam and Power Conversion System - Turbine Generator and Support System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Valve Bodies	Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material - Pitting Corrosion	One-Time Inspection Program	VIII.B1-4	3.4.1-16	A
					Water Chemistry Program	VIII.B1-4	3.4.1-16	B

Notes for Tables 3.4.2-1 through 3.4.2-8

A Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

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

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

D Component is different, but consistent with NUREG-1801 for material, environment, and aging effect. AMP takes 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 for this component.

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

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

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

J Neither the component nor the material and environment combination are evaluated in NUREG-1801.

Plant-specific notes:

401 Aging mechanism(s) is not in NUREG-1801 for this component, material, and environment combination.

402 Intentionally left blank.

403 Intentionally left blank.

404 There are no bolts with a specified minimum yield strength >150 ksi in this system. Therefore, SCC is not an applicable aging effect/mechanism.

405 A Steam environment is evaluated the same as a Treated Water environment.

406 Components that are buried in the ground are analyzed in the same manner as raw water (damp soil containing groundwater).

407 No credit is taken for protective coatings (paint, galvanized pipe, linings, etc.) for components in the PINGP mechanical aging management evaluations.

408 In some cases where the Plant Chemistry Program is not a viable option and aging effects/mechanisms are not expected to be significant; the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program alone is credited for managing these aging effects. The AMP referenced is appropriate for the aging effect(s)/mechanism(s) identified and provides assurance that the aging effect(s)/mechanism(s) are effectively managed through the period of extended operation.

409 Intentionally left blank.

410 Loss of material due to galvanic corrosion is evaluated in a raw water, treated water, fuel oil, lubricating oil, and wet air/gas (if applicable) environment.

411 The Unit 2 Pressurizer surge nozzle to safe end weld is Alloy 82. Examinations of the weld are conducted by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program.

412 The aging effect/mechanism, cracking due to stress corrosion cracking, was assigned to this component based on industry Operating Experience.

413 Materials science evaluation for this material in this environment results in no aging effects.

414 Unit 2 steam generators are Westinghouse Model 51 Steam Generators and have experienced corrosion. Therefore, additional inspections to detect general and pitting corrosion are performed on the shell to transition cone weld under the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program.

415 Denting of the steam generator U-tubes is only applicable to Unit 2. Unit 1 U-tubes are held in place by stainless steel tube support plates with broached holes.

416 Loss of material due to MIC is evaluated for stainless steel in a raw water environment.

417 Dry/Filtered Instrument Air is evaluated the same as gas.

418 Loss of material due to selective leaching for copper alloys and gray cast iron is evaluated in a fuel oil and lubricating oil environment.

419 The environment for this line item is equivalent to Plant Indoor Air - Uncontrolled with the potential for moisture or condensation.

420 The environment for this component is evaluated as Raw Water and is essentially waste water or a potential mixture of water and oil.

421 This line item includes both heat exchanger components and non-regenerative heat exchanger components.

422 Chrome-molybdenum alloy components are evaluated the same as steel (carbon steel, low-alloy steel and cast iron) components.

423 The External Surfaces Monitoring Program is credited with managing aging effects of internal surfaces where the external surfaces are subject to the same environment or stressor as the internal surfaces such that that external condition is representative of the internal surface condition.

3.5 Aging Management of Containments, Structures, and Component Supports

3.5.1 Introduction

This section provides the results of the AMR for those Containments, Structures and Component Supports identified in Section 2.4 as being subject to an AMR. The structures and commodity groups which are addressed in this section are described in the indicated sections.

- Auxiliary and Turbine Buildings (Section 2.4.1)
- Component Supports (Section 2.4.2)
- Cranes, Heavy Loads, Fuel Handling (Section 2.4.3)
- D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building (Section 2.4.4)
- Fire Protection Barriers (Section 2.4.5)
- Radwaste Building, Old Administration Building, and Administration Building Addition (Section 2.4.6)
- Reactor Containment Vessels Units 1 and 2 (Section 2.4.7)
- SBO Yard Structures (Section 2.4.8)
- Shield Buildings Units 1 and 2 (Section 2.4.9)
- Tank Foundations (Section 2.4.10)
- Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse (Section 2.4.11)

Table 3.5.1, Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports, provides the summary of the programs evaluated in NUREG-1801 for the Structures and Component Supports components that are relied on for License Renewal. This table uses the format described in Section 3.0. Note that this table only includes those components that are applicable to a PWR.

3.5.2 Results

The following tables summarize the results of the AMR for Structures and Component Supports:

Table 3.5.2-1, Structures and Component Supports - Auxiliary and Turbine Buildings - Summary of Aging Management Evaluation

Table 3.5.2-2, Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Table 3.5.2-3, Structures and Component Supports - Cranes, Heavy Loads, Fuel Handling - Summary of Aging Management Evaluation

Table 3.5.2-4, Structures and Component Supports - D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building - Summary of Aging Management Evaluation

Table 3.5.2-5, Structures and Component Supports - Fire Protection Barriers - Summary of Aging Management Evaluation

Table 3.5.2-6, Structures and Component Supports - Radwaste Building, Old Administration Building, and Administration Building Addition - Summary of Aging Management Evaluation

Table 3.5.2-7, Structures and Component Supports - Reactor Containment Vessels Units 1 and 2 - Summary of Aging Management Evaluation

Table 3.5.2-8, Structures and Component Supports - SBO Yard Structures - Summary of Aging Management Evaluation

Table 3.5.2-9, Structures and Component Supports - Shield Buildings Units 1 and 2 - Summary of Aging Management Evaluation

Table 3.5.2-10, Structures and Component Supports - Tank Foundations - Summary of Aging Management Evaluation

Table 3.5.2-11, Structures and Component Supports - Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse - Summary of Aging Management Evaluation

The materials that specific components are fabricated from, the environments to which components are exposed, the potential aging effects requiring management, and the AMPs used to manage these aging effects are provided for each of the above structures and commodities in the following subsections of Section 3.5.2.1, Materials, Environment, Aging Effects Requiring Management and Aging Management Programs:

Section 3.5.2.1.1, Auxiliary and Turbine Buildings

Section 3.5.2.1.2, Component Supports

Section 3.5.2.1.3, Cranes, Heavy Loads, Fuel Handling

Section 3.5.2.1.4, D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building

Section 3.5.2.1.5, Fire Protection Barriers

Section 3.5.2.1.6, Radwaste Building, Old Administration Building, and Administration Building Addition

Section 3.5.2.1.7, Reactor Containment Vessels Units 1 and 2

Section 3.5.2.1.8, SBO Yard Structures

Section 3.5.2.1.9, Shield Buildings Units 1 and 2

Section 3.5.2.1.10, Tank Foundations

Section 3.5.2.1.11, Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse

3.5.2.1 Materials, Environment, Aging Effects Requiring Management and Aging Management Programs

3.5.2.1.1 Auxiliary and Turbine Buildings

Materials

The materials of construction for the Auxiliary and Turbine Buildings components are:

- Aluminum
- Built-up roofing composite
- Ceramic
- Concrete block
- Elastomers
- Reinforced concrete
- Reinforced concrete, grout
- Reinforced concrete, porous concrete
- Reinforced concrete, unreinforced concrete
- Stainless steel
- Steel
- Wood

Environment

The Auxiliary and Turbine Buildings components are exposed to the following environments:

- Air indoor

- Air outdoor
- Air with borated water leakage
- Embedded in concrete
- Groundwater/soil
- Treated borated water

Aging Effects Requiring Management

The following aging effects associated with the Auxiliary and Turbine Buildings components require management:

- Concrete cracking and spalling/ aggressive chemical attack, and reaction with aggregates
- Concrete cracking and spalling/freeze-thaw, aggressive chemical attack, and reaction with aggregates
- Cracking due to expansion/reaction with aggregates
- Cracking, loss of bond, and loss of material (spalling, scaling)/corrosion of embedded steel
- Cracking/restraint, shrinkage, creep, and aggressive environment
- Cracking/ stress corrosion cracking; loss of material/pitting and crevice corrosion
- Cracks and distortion/ increased stress levels from settlement
- Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/aggressive chemical attack
- Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide
- Loss of material (spalling, scaling) and cracking/ freeze-thaw
- Loss of material/ boric acid corrosion
- Loss of material/corrosion
- Loss of material/corrosion of embedded steel
- Loss of material/crevice corrosion
- Loss of material/general corrosion
- Loss of sealing/deterioration of seals, gaskets, and moisture barriers

- Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms
- Separation, environmental degradation, water in-leakage/weathering

Aging Management Programs

The following AMPs manage the aging effects for the Auxiliary and Turbine Buildings components:

- Boric Acid Corrosion Program
- Fire Protection Program
- Masonry Wall Program
- Structures Monitoring Program
- Water Chemistry Program

3.5.2.1.2 Component Supports

Materials

The materials of construction for the Component Supports components are:

- Aluminum
- Aluminum, stainless steel
- Calcium silicate
- Elastomers
- Fiberglass
- Fiberglass, calcium silicate
- Lubrite or graphitic tool steel
- Reflective metallic insulation
- Reflective metallic insulation, fiberglass, calcium silicate
- Reinforced concrete
- Reinforced concrete, grout
- Stainless steel
- Steel
- Steel (low alloy, yield strength > 150 ksi)

Environment

The Component Supports components are exposed to the following environments:

- Air indoor
- Air outdoor
- Air with borated water leakage
- Groundwater/soil (accessible)
- Treated borated water

Aging Effects Requiring Management

The following aging effects associated with the Component Supports components require management:

- Cracking/stress corrosion cracking
- Hardening and loss of strength/ elastomer degradation
- Lockup/wear
- Loss of material/boric acid corrosion
- Loss of material/crevice corrosion
- Loss of material/general corrosion
- Loss of material/general, pitting, crevice, and microbiologically influenced corrosion
- Loss of mechanical function/ corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads
- Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms
- Reduction or loss of isolation function/ radiation hardening, temperature, humidity, sustained vibratory loading

Aging Management Programs

The following AMPs manage the aging effects for the Component Supports components:

- ASME Section XI, Subsection IWF Program
- Bolting Integrity Program
- Boric Acid Corrosion Program

- RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program
- Structures Monitoring Program
- Water Chemistry Program

3.5.2.1.3 Cranes, Heavy Loads, Fuel Handling

Materials

The materials of construction for the Cranes, Heavy Loads, Fuel Handling components are:

- Stainless steel
- Steel

Environment

The Cranes, Heavy Loads, Fuel Handling components are exposed to the following environments:

- Air indoor
- Air with borated water leakage
- Treated borated water

Aging Effects Requiring Management

The following aging effects associated with the Cranes, Heavy Loads, Fuel Handling components require management:

- Loss of material/boric acid corrosion
- Loss of material/crevice corrosion
- Loss of material/general corrosion
- Loss of material/wear and general corrosion

Aging Management Programs

The following AMPs manage the aging effects for the Cranes, Heavy Loads, Rigging, Fuel Handling components:

- Boric Acid Corrosion Program
- Inspection of Overhead Heavy Load and LIght Load (Related to Refueling) Handling Systems Program
- Water Chemistry Program

3.5.2.1.4 D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building

Materials

The materials of construction for the D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building components are:

- Aluminum
- Built-up roofing composite
- Concrete block
- Elastomers
- Reinforced concrete
- Reinforced concrete, grout
- Reinforced concrete, porous concrete
- Reinforced concrete, unreinforced concrete
- Steel

Environment

The D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building components are exposed to the following environments:

- Air indoor
- Air outdoor
- Embedded in concrete
- Groundwater/soil

Aging Effects Requiring Management

The following aging effects associated with the D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building components require management:

- Concrete cracking and spalling/aggressive chemical attack, and reaction with aggregates
- Concrete cracking and spalling/freeze-thaw, aggressive chemical attack, and reaction with aggregates
- Cracking and spalling/fatigue due to low level repeated load

- Cracking due to expansion/reaction with aggregates
- Cracking, loss of bond, and loss of material (spalling, scaling)/corrosion of embedded steel
- Cracking/ restraint, shrinkage, creep, and aggressive environment
- Cracks and distortion/increased stress levels from settlement
- Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/aggressive chemical attack
- Increase in porosity and permeability, loss of strength/leaching of calcium hydroxide
- Loss of material (spalling, scaling) and cracking/freeze-thaw
- Loss of material/corrosion
- Loss of material/corrosion of embedded steel
- Loss of material/galvanic corrosion
- Loss of material/general corrosion
- Loss of sealing/deterioration of seals, gaskets, and moisture barriers
- Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms
- Reduction of strength and modulus/elevated temperature
- Separation, environmental degradation, water in-leakage/weathering

Aging Management Programs

The following AMPs manage the aging effects for the D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building components:

- Fire Protection Program
- Masonry Wall Program
- Structures Monitoring Program

3.5.2.1.5 Fire Protection Barriers

Materials

The materials of construction for the Fire Protection Barriers components are:

- Cementitious fireproofing and fire rated caulks and putties with smooth hard surface, rigid non-shrink mineral fiber board, fibrous fire rated material

- Cementitious fireproofing with rough surface (sprayed on or troweled)
- Elastomers
- Reinforced concrete
- Stainless steel
- Steel
- Unreinforced concrete, grout

Environment

The Fire Protection Barriers components are exposed to the following environments:

- Air indoor
- Air outdoor
- Embedded in concrete

Aging Effects Requiring Management

The following aging effects associated with the Fire Protection Barriers components require management:

- Concrete cracking and spalling/ aggressive chemical attack, and reaction with aggregates
- Concrete cracking and spalling/freeze-thaw, aggressive chemical attack, and reaction with aggregates
- Increased hardness, shrinkage and loss of strength/weathering
- Loss of material/abrasion; cracking/vibration
- Loss of material/abrasion; cracking/vibration and movement; separation/ vibration and movement
- Loss of material/corrosion
- Loss of material/corrosion of embedded steel
- Loss of material/corrosion, holes, missing parts; change in door clearance/ wear, damage, connection slippage, warping
- Loss of material/flaking, abrasion; cracking/vibration
- Loss of material/general corrosion
- Loss of material/wear, corrosion, missing parts

Aging Management Programs

The following AMPs manage the aging effects for the Fire Protection Barriers components:

- Fire Protection Program
- Structures Monitoring Program

3.5.2.1.6 Radwaste Building, Old Administration Building, and Administration Building Addition

Materials

The materials of construction for the Radwaste Building, Old Administration Building, and Administration Building Addition components are:

- Elastomers
- Reinforced concrete
- Reinforced concrete, porous concrete
- Steel

Environment

The Radwaste Building, Old Administration Building, and Administration Building Addition components are exposed to the following environments:

- Air indoor
- Air outdoor
- Air with borated water leakage
- Groundwater/soil

Aging Effects Requiring Management

The following aging effects associated with the Radwaste Building, Old Administration Building, and Administration Building Addition components require management:

- Concrete cracking and spalling/aggressive chemical attack, and reaction with aggregates
- Concrete cracking and spalling/freeze-thaw, aggressive chemical attack, and reaction with aggregates
- Cracking due to expansion/reaction with aggregates

- Cracking, loss of bond, and loss of material (spalling, scaling)/corrosion of embedded steel
- Cracks and distortion/ increased stress levels from settlement
- Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack
- Increase in porosity and permeability, loss of strength/leaching of calcium hydroxide
- Loss of material (spalling, scaling) and cracking/freeze-thaw
- Loss of material/ boric acid corrosion
- Loss of material/corrosion
- Loss of material/corrosion of embedded steel
- Loss of sealing/deterioration of seals, gaskets, and moisture barriers

Aging Management Programs

The following AMPs manage the aging effects for the Radwaste Building, Old Administration Building, and Administration Building Addition components:

- Boric Acid Corrosion Program
- Fire Protection Program
- Structures Monitoring Program

3.5.2.1.7 Reactor Containment Vessels Units 1 and 2

Materials

The materials of construction for the Reactor Containment Vessels Units 1 and 2 components are:

- Concrete block
- Elastomers
- Reinforced concrete
- Reinforced concrete, grout
- Stainless steel
- Stainless steel; dissimilar metal welds
- Steel
- Steel; dissimilar metal welds
- Unreinforced concrete

Environment

The Reactor Containment Vessels Units 1 and 2 components are exposed to the following environments:

- Air indoor
- Air with borated water leakage
- Embedded in concrete
- Treated borated water

Aging Effects Requiring Management

The following aging effects associated with the Reactor Containment Vessels Units 1 and 2 components require management:

- Cracking due to expansion/reaction with aggregates
- Cracking, loss of bond, and loss of material (spalling, scaling)/corrosion of embedded steel
- Cracking/ restraint, shrinkage, creep, and aggressive environment
- Cracking/stress corrosion cracking
- Cracking/ stress corrosion cracking; loss of material/pitting and crevice corrosion
- Cracks and distortion/increased stress levels from settlement
- Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/aggressive chemical attack
- Loss of leak tightness/mechanical wear of locks, hinges and closure mechanisms
- Loss of material/boric acid corrosion
- Loss of material/corrosion
- Loss of material/crevice corrosion
- Loss of material/general corrosion
- Loss of sealing; leakage through containment/deterioration of joint seals, gaskets, and moisture barriers (caulking, flashing, and other sealants)
- Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms
- Reduction of strength and modulus/elevated temperature

Aging Management Programs

The following AMPs manage the aging effects for the Reactor Containment Vessels Units 1 and 2 components:

- 10 CFR Part 50, Appendix J Program
- ASME Section XI, Subsection IWE Program
- Boric Acid Corrosion Program
- Fire Protection Program
- Masonry Wall Program
- Structures Monitoring Program
- Water Chemistry Program

3.5.2.1.8 SBO Yard Structures

Materials

The materials of construction for the SBO Yard Structures components are:

- Concrete block
- Reinforced concrete
- Reinforced concrete, grout
- Reinforced concrete, porous concrete
- Steel

Environment

The SBO Yard Structures components are exposed to the following environments:

- Air indoor
- Air outdoor
- Groundwater/soil

Aging Effects Requiring Management

The following aging effects associated with the SBO Yard Structures components require management:

- Cracking due to expansion/reaction with aggregates
- Cracking, loss of bond, and loss of material (spalling, scaling)/corrosion of embedded steel

- Cracking/restraint, shrinkage, creep, and aggressive environment
- Cracks and distortion/increased stress levels from settlement
- Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/aggressive chemical attack
- Increase in porosity and permeability, loss of strength/leaching of calcium hydroxide
- Loss of material (spalling, scaling) and cracking/freeze-thaw
- Loss of material caused by mechanical wear/wind blowing on transmission conductors
- Loss of material/corrosion
- Loss of material/general corrosion
- Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms

Aging Management Programs

The following AMPs manage the aging effects for the SBO Yard Structures components:

- Structures Monitoring Program

3.5.2.1.9 Shield Buildings Units 1 and 2

Materials

The materials of construction for the Shield Buildings Units 1 and 2 components are:

- Elastomers
- Reinforced concrete
- Reinforced concrete, grout
- Reinforced concrete, porous concrete
- Stainless steel
- Steel

Environment

The Shield Buildings Units 1 and 2 components are exposed to the following environments:

- Air indoor

- Air outdoor
- Air with borated water leakage
- Embedded in concrete
- Groundwater/soil

Aging Effects Requiring Management

The following aging effects associated with the Shield Buildings Units 1 and 2 components require management:

- Concrete cracking and spalling/aggressive chemical attack, and reaction with aggregates
- Concrete cracking and spalling/freeze-thaw, aggressive chemical attack, and reaction with aggregates
- Cracking due to expansion/reaction with aggregates
- Cracking, loss of bond, and loss of material (spalling, scaling)/corrosion of embedded steel
- Cracks and distortion/increased stress levels from settlement
- Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/aggressive chemical attack
- Increase in porosity and permeability, loss of strength/leaching of calcium hydroxide
- Loss of material (spalling, scaling) and cracking/freeze-thaw
- Loss of material/boric acid corrosion
- Loss of material/corrosion
- Loss of material/corrosion of embedded steel
- Loss of material/general corrosion
- Loss of sealing/deterioration of seals, gaskets, and moisture barriers
- Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms

Aging Management Programs

The following AMPs manage the aging effects for the Shield Buildings Units 1 and 2 components:

- Boric Acid Corrosion Program
- Fire Protection Program

- Structures Monitoring Program

3.5.2.1.10 Tank Foundations

Materials

The materials of construction for the Tank Foundations components are:

- Reinforced concrete
- Reinforced concrete, grout
- Reinforced concrete, porous concrete
- Reinforced concrete, unreinforced concrete
- Steel

Environment

The Tank Foundations components are exposed to the following environments:

- Air outdoor
- Embedded in concrete
- Groundwater/soil

Aging Effects Requiring Management

The following aging effects associated with the Tank Foundations components require management:

- Cracking due to expansion/reaction with aggregates
- Cracking, loss of bond, and loss of material (spalling, scaling)/corrosion of embedded steel
- Cracks and distortion/increased stress levels from settlement
- Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/aggressive chemical attack
- Increase in porosity and permeability, loss of strength/leaching of calcium hydroxide
- Loss of material (spalling, scaling) and cracking/freeze-thaw
- Loss of material/corrosion
- Loss of material/general corrosion
- Loss of material/general, pitting, crevice, and microbiologically influenced corrosion

- Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms

Aging Management Programs

The following AMPs manage the aging effects for the Tank Foundations components:

- Structures Monitoring Program

3.5.2.1.11 Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse

Materials

The materials of construction for the Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse components are:

- Built-up roofing composite
- Elastomers
- Reinforced concrete
- Reinforced concrete, grout
- Reinforced concrete, porous concrete
- Soil, rip rap, engineered fill
- Steel

Environment

The Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse components are exposed to the following environments:

- Air indoor
- Air outdoor
- Embedded in concrete
- Groundwater/soil
- Groundwater/soil (accessible)

Aging Effects Requiring Management

The following aging effects associated with the Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse components require management:

- Concrete cracking and spalling/aggressive chemical attack, and reaction with aggregates
- Concrete cracking and spalling/freeze-thaw, aggressive chemical attack, and reaction with aggregates
- Cracking due to expansion/reaction with aggregates
- Cracking, loss of bond, and loss of material (spalling, scaling)/corrosion of embedded steel
- Cracks and distortion/increased stress levels from settlement
- Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/aggressive chemical attack
- Increase in porosity and permeability, loss of strength/leaching of calcium hydroxide
- Loss of material (spalling, scaling) and cracking/freeze-thaw
- Loss of material, loss of form/erosion, settlement, sedimentation, frost action, waves, currents, surface runoff, seepage
- Loss of material/abrasion; cavitation
- Loss of material/corrosion of embedded steel
- Loss of material/general corrosion
- Loss of material/general, pitting, crevice, and microbiologically induced corrosion
- Loss of sealing/deterioration of seals, gaskets, and moisture barriers
- Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms
- Reduction of strength and modulus/elevated temperature
- Separation, environmental degradation, water in-leakage/weathering

Aging Management Programs

The following AMPs manage the aging effects for the Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse components:

- Fire Protection Program
- RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program
- Structures Monitoring Program

3.5.2.2 Further Evaluation of Aging Management as Recommended by NUREG-1801

NUREG-1801 Volume 1 Tables provide the basis for identifying those programs that warrant further evaluation by the reviewer in the LRA. For the Containments, Structures, and Component Supports, those programs are addressed in the following sections.

3.5.2.2.1 PWR and BWR Containments

3.5.2.2.1.1 Aging of Inaccessible Concrete Areas

The base of the PINGP free standing steel containment (i.e. Reactor Containment Vessel) is supported by unreinforced concrete placed between the Shield Building base mat / wall and the elliptical bottom head. The top of the unreinforced concrete, which extends across the annular space between the Containment and Shield Building, is exposed to a controlled indoor air environment. Elsewhere it is in contact with either the containment bottom head or the reinforced concrete Shield Building. As the unreinforced concrete does not serve a pressure retaining function, it is not an ASME Section III, Division 2 Class CC item and, therefore, is not subject to Section XI, Subsection IWL in-service inspection requirements. The Structures Monitoring Program manages the unreinforced concrete for the aging mechanism aggressive chemical attack. The Structures Monitoring Program is consistent with NUREG-1801.

Note: Concrete inside containment and the concrete foundation of the Shield Building that supports containment is evaluated elsewhere.

3.5.2.2.1.2 Cracks and Distortion due to Increased Stress Levels from Settlement; Reduction of Foundation Strength, Cracking and Differential Settlement due to Erosion of Porous Concrete Subfoundations, if Not Covered by Structures Monitoring Program

Settlement of the unreinforced concrete beneath containment is managed by the Structures Monitoring Program. The Structures Monitoring Program is consistent with NUREG-1801. Since the unreinforced concrete does not serve a pressure retaining function, it is not an ASME Section III, Division 2 Class CC item and, therefore, is not subject to Section XI, Subsection IWL in-service inspection requirements. The Shield Building mat foundation, located beneath the unreinforced concrete, supports the Reactor Containment Vessel.

PINGP does not have porous concrete sub-foundations; therefore, the aging effect / mechanism associated with these is not applicable.

3.5.2.2.1.3 Reduction of Strength and Modulus of Concrete Structures due to Elevated Temperature

Elevated temperature for the unreinforced concrete beneath containment is well below the allowable limits of 150 degrees F general and 200 degrees F local and therefore the aging effect for this mechanism is not applicable. Elevated temperature is an issue of concern inside containment at the bio-shield wall and outside containment at diesel exhaust pipes. Concrete inside containment and the concrete foundation of the Shield Building that supports containment are evaluated elsewhere.

3.5.2.2.1.4 Loss of Material due to General, Pitting and Crevice Corrosion

This subsection addresses loss of material due to general, pitting and crevice corrosions for steel components that could occur at locations that are accessible for inspection as well as at locations that are not accessible for inspection.

For steel components located in accessible areas (i.e. air indoor environment), loss of material is managed by the ASME Section XI, Subsection IWE Program and the 10 CFR Part 50, Appendix J Program in accordance with NUREG-1801 and NUREG-1800. ASME Section XI, Subsection IWE Program and the 10 CFR Part 50, Appendix J Program are consistent with NUREG-1801. NUREG includes the aging effect loss of material due to general, pitting, and crevice corrosions, however loss of material due to pitting and crevice corrosions is not applicable at PINGP since air indoor and air outdoor environments do not contain aggressive contaminants and are not continuously wetted.

The containment vessel, with penetration sleeves and other attached MC pressure retaining items, is designated as a fire barrier. Therefore, the Fire Protection Program is also credited with managing loss of material due to general corrosion. The Fire Protection Program is consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for Fire Protection Program implementation.

For steel components that are not accessible for inspection (i.e. embedded portions of the pressure vessel, penetration sleeves, and miscellaneous members embedded in concrete), an evaluation is necessary to determine if loss of material is significant and requires aging management. NUREG-1801 and NUREG-1800 provide criteria to evaluate plant-specific applicability of loss of material for inaccessible steel components.

The following evaluation determined that loss of material is not significant for inaccessible steel components embedded in concrete and therefore aging management is not required.

NUREG-1801 criteria include four requirements that must be satisfied. Those requirements are provided below and are followed by the plant-specific evaluation of each requirement.

NUREG-1801 criteria:

1. Concrete meeting the requirements of ACI 318 or 349 and the guidance of 201.2R was used for the containment concrete in contact with the embedded containment shell or liner.
2. The concrete is monitored to ensure that it is free of penetrating cracks that provide a path for water seepage to the surface of the containment shell or liner.
3. The moisture barrier, at the junction where the shell or liner becomes embedded, is subject to aging management activities in accordance with ASME Section XI, Subsection IWE requirements.
4. Borated water spills and water ponding on the containment concrete floor are not common and when detected are cleaned up in a timely manner.

PINGP plant-specific evaluation:

1. PINGP concrete design specifications include requirements that satisfy ACI 318 standards for materials, durability, concrete quality, and mixing and placing of concrete. Plant documents confirmed that concrete was constructed in accordance with the recommendations in ACI 201.2R for durability and therefore able to resist weathering action, chemical attack, abrasion, leaching of calcium hydroxide, corrosion of reinforcement, and chemical reactions of aggregates through adherence to the following industry Codes and Standards.

   Materials used in the concrete mix design conformed to industry Standards that ensured consistent, proportional, non-porous concrete of quality materials and included,

   ASTM C94, "Standard Specification for Ready-Mixed Concrete" and

   ASTM C150, "Specification for Portland Cement."

   Aggregates conformed to industry requirements and were accepted based on,

   ASTM C33, "Specifications for Concrete Aggregates"

   ASTM C295 "Petrographic Examination",

   ASTM C289, "Test for Potential Reactivity of Aggregates" and others.

   Mixing and delivering of concrete was in accordance with ACI Codes for hot and cold weather conditions including,

   ACI 605, "Recommended Practices for Hot Weather Concreting" and

   ACI 306, "Recommended Practices for Winter Concreting",

   and entrained air, concrete curing, and attention to construction practices were in accordance with,

   ASTM C260, "Specification for Air-Entraining Admixtures for Concrete",

   ACI C612, "Curing of Concrete", and

   ACI C614, "Recommended Practice for Measuring, Mixing, and Placing Concrete."

2. For accessible concrete inside each Reactor Containment Vessel (RCV), the Structures Monitoring Program inspects the concrete for cracking in the vicinity of the moisture barrier at the joint between the RCV shell and concrete floor inside the RCV. In the Shield Building where unreinforced

concrete is in contact with the outer RCV shell, inspections are performed by the Structures Monitoring Program. These inspections ensure that the concrete is free of penetrating cracks that provide a path for water seepage to the RCV shell.

3. The PINGP ASME Section XI, Subsection IWE Program manages aging effects for the moisture barrier inside the RCV at the joint between the RCV shell and concrete floor. In the Shield Building annulus, the moisture barrier between the RCV shell and Shield Building concrete floor is also managed by the PINGP ASME Section XI, Subsection IWE Program.
4. Borated water spills and water ponding on concrete floors inside and outside the RCV are managed by the Boric Acid Corrosion Program's implementing procedures.

3.5.2.2.1.5 Loss of Prestress due to Relaxation, Shrinkage, Creep, and Elevated Temperature

This line item addresses pre-stressed concrete containment and is not applicable to the free standing steel containments at PINGP.

3.5.2.2.1.6 Cumulative Fatigue Damage

Cumulative fatigue damage is a TLAA as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). Specific components requiring TLAA evaluations include penetration sleeves and penetration bellows. These TLAAs are addressed in Section 4.6 of the LRA. Note: Suppression pool shell and unbraced downcomers are not applicable to PINGP since PINGP containments do not incorporate these components.

3.5.2.2.1.7 Cracking due to Stress Corrosion Cracking (SCC)

This subsection lists components associated with containment that require aging management for cracking due to SCC, specifically the stainless steel penetrations sleeves and penetration bellows with dissimilar metal welds.

NUREG-1801 criteria state that pressure retaining weld Exam Category E-B (ASME B&PV Code Section XI, Subsection IWE, Table IWE-2500-1 Examination Category EB, visual VT-1 examination method) and pressure retaining dissimilar metal welds Category E-F (ASME B&PV Code Section XI, Subsection IWE, Table IWE-2500-1 Examination Category EF, surface examination method) for penetration bellows and penetration sleeves are recommended for the extended period of operations. PINGP operating history on bellow replacements revealed no significant age-related issues. Industry operating history identified cracks in the bellows but did not identify cracks of the weld metal. Welds for penetration bellow assemblies are in a sheltered, non-corrosive environment. Additionally, welds are located outside primary containment in an air indoor environment where temperatures are not expected to exceed threshold limits for stress corrosion cracking. In light of the non-aggressive environment and plant-specific and industry operating histories, weld examinations utilizing optional Examination Categories E-B and E-F are not warranted. Existing requirements for visual weld examinations with the adjacent base metal in accordance with ASME Section XI, Subsection IWE, Examination Category E-A and 10 CFR 50, Appendix J leak rate testing (Examination Category E-P) are sufficient to detect weld cracking and loss of material for penetration sleeves and bellows. Therefore pressure retaining welds and pressure retaining dissimilar metal welds do not receive separate VT-1 or surface examinations unless these items are designated for augmented examination (ASME B&PV Code Section XI, Subsection IWE, Table IWE-2500-1 Examination Category EC) in accordance with IWE-1240. ASME Section XI, Subsection IWE Program and the 10 CFR 50, Appendix J Program are consistent with NUREG-1801.

Penetration sleeves and penetration bellows provide a fire barrier function and are relied upon as fire barriers. For these components, the ASME Section XI, Subsection IWE Program, 10 CFR Part 50, Appendix J Program, and Fire Protection Program are credited with managing cracking due to stress corrosion cracking. The Fire Protection Program is consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Fire Protection Program implementation.

3.5.2.2.1.8 Cracking due to Cyclic Loading

There is a CLB fatigue analysis for penetration sleeves and bellows and therefore this line item is not applicable. Table Line Item 3.5.1-09 and Further Evaluation Section 3.5.2.2.1.6 include a discussion on fatigue analysis of penetration sleeves and bellows.

Note: Suppression pool shell and unbraced downcomers are not applicable to PINGP since PINGP containments do not incorporate these components.

3.5.2.2.1.9 **Loss of Material (Scaling, Cracking, and Spalling) due to Freeze-Thaw**

Freeze-thaw of the unreinforced concrete beneath containment is not applicable since it is not exposed to air outdoor or groundwater/ soil environments. The concrete foundation of the Shield Building that supports containment is evaluated elsewhere.

3.5.2.2.1.10 **Cracking due to Expansion and Reaction with Aggregate, and Increase in Porosity and Permeability due to Leaching of Calcium Hydroxide**

The base of the PINGP free standing steel containment (i.e. Reactor Containment Vessel) is supported by unreinforced concrete placed between the Shield Building base mat / wall and the elliptical bottom head. The top of the unreinforced concrete, which extends across the annular space between the containment and Shield Building, is exposed to a controlled indoor air environment. Elsewhere it is in contact with either the containment bottom head or the reinforced concrete Shield Building. As the unreinforced concrete does not serve a pressure retaining function, it is not an ASME Section III, Division 2 Class CC item and, therefore, is not subject to Section XI, Subsection IWL in-service inspection requirements. The Structures Monitoring Program manages the unreinforced concrete for the aging mechanism reaction with aggregate. The Structures Monitoring Program is consistent with NUREG-1801.

Leaching of calcium hydroxide for the unreinforced concrete beneath containment is not applicable since it is not exposed to flowing water or a head of standing water. The unreinforced concrete beneath containment and in the annular space is exposed only to an air indoor environment.

3.5.2.2.2.1 **Aging of Structures Not Covered by Structures Monitoring Program**

This subsection addresses various generic aging effects for concrete components located in areas accessible for inspection. Concrete aging effects include:

- Cracking, loss of bond, and loss of material (spalling, scaling) due to corrosion of embedded steel
- Increase in porosity and permeability, cracking, loss of material (spalling, scaling) due to aggressive chemical attack
- Loss of material (spalling, scaling) and cracking due to freeze-thaw

- Cracking due to expansion due to reaction with aggregates
- Cracks and distortion due to increased stress levels from settlement
- Reduction in foundation strength, cracking, differential settlement due to erosion of porous concrete sub-foundation
  Note: PINGP does not have porous concrete sub-foundations; therefore, the aging effect / mechanism associated with these is not applicable.

For concrete components located in accessible areas, the aging effects listed above (with the exception of reduction in foundation strength, cracking, differential settlement due to erosion of porous concrete sub-foundation, which is not applicable as noted) are managed by the Structures Monitoring Program in accordance with NUREG-1801 and NUREG-1800. The Structures Monitoring Program is consistent with NUREG-1801.

Additionally, this subsection addresses generic aging effects for structural steel and RPV support shoes located in areas both accessible and not accessible for inspection. Steel aging effects include:

- Loss of material due to corrosion
- Lock-up due to wear

The aging effect loss of material due to corrosion for structural steel located in accessible areas is managed by the Structures Monitoring Program in accordance with NUREG-1801and NUREG-1800. Note that protective coatings are not relied upon to manage the effects of aging and therefore the Structures Monitoring Program does not include provisions to address protective coating monitoring and maintenance.

Some steel components are located below grade or partially below grade and therefore inaccessible for inspection. The Structures Monitoring Program requires examination of buried components whenever the surrounding soil is excavated. Observed condition of excavated items is used as a basis for evaluating the condition of inaccessible steel components.

The ASME Section XI, Subsection IWF Program is credited with managing lock-up due to wear for sliding support surfaces of the RPV support shoes. Note: The steam generator supports do not incorporate sliding surfaces.

The ASME Section XI, Subsection IWF Program is consistent with NUREG-1801.

3.5.2.2.2.2 **Aging Management of Inaccessible Areas**

1. This subsection addresses loss of material (spalling, scaling) and cracking due to freeze-thaw for concrete components that could occur in areas that are not accessible for inspection. For areas accessible for inspection, see Further Evaluation Section 3.5.2.2.2.1. An evaluation is necessary to determine if loss of material and cracking are significant and require aging management. NUREG-1801 and NUREG-1800 provide criteria to evaluate plant-specific applicability for loss of material and cracking due to freeze-thaw for inaccessible concrete components.

   The following evaluation determined that freeze thaw cycles are not expected to have a significant effect on PINGP concrete. To ensure against freeze-thaw degradation, the potential for effects induced by freeze-thaw cycles on inaccessible concrete is assessed by monitoring accessible areas of concrete structures for evidence of freeze-thaw induced cracking and loss of material. Examinations of accessible surfaces are done under the Structures Monitoring Program. The Structures Monitoring Program is consistent with NUREG-1801.

   PINGP is located in a severe weathering region according to Figure 1 of ASTM C33-90. Plant specifications show that the concrete entrained air content was specified to be between 4% and 8% and water-to-cement ratio was specified not to exceed 0.46. The mix proportions were subject to the final approval by the Engineer. The 28 day concrete strength was required to meet the minimum strength specified in accordance with ACI 301. These values confirm that the concrete mix design meets the air content and water-to-cement ratio specified in ACI 318-63 (i.e. air content from 4.5% to 7.5%, +/- 1.5%, and water-to-cement ratio from 0.40 to 0.50).

   PINGP concrete mix designs were proof tested to ensure that they produced required strengths of 15 percent over specified strengths for each class of concrete in accordance with ACI Standard 613. Type II Portland cement was used in concrete mixes for many critical concrete structures, and air entraining admixtures and low water-to-cement ratios were specified to enhance resistance to freeze-thaw cycling and moisture absorption. Concrete inspections documented in PINGP

Reports NSPI-12-6062 and NSPI-12-7175 conducted in the late 1980's showed no significant degradation due to freeze-thaw. Concrete inspections documented in PINGP Report NSPI-12-7134 dated April of 1988 showed minor damage at two construction joints which were limited to the surface concrete. Concrete inspections conducted more recently have shown a few locations where minor degradation due to freeze-thaw has occurred. The minor degradations were localized and on surfaces more susceptible to moisture collection (i.e. construction joints). Plant corrective actions were taken and conditions were repaired. Overall plant concrete inspections continue to show that there is no significant freeze-thaw degradation.

Material acceptability and qualification of concrete, grout, and reinforcing steel conform to industry codes/standards and include the following among others:

- ACI 301, "Specifications for Structural Concrete for Buildings",
- ACI 306, "Recommended Practices for Winter Concreting",
- ASTM C150, "Specification for Portland Cement",
- ASTM C94, "Standard Specification for Ready-Mixed Concrete",
- ASTM C260, "Specification for Air-Entraining Admixtures for Concrete",
- ASTM C33, "Specifications for Concrete Aggregates",
- ASTM C231, "Test for Air Content of Freshly Mixed Concrete by the Pressure Method",
- ASTM C289, "Test for Potential Reactivity of Aggregates",
- ASTM C143, "Test for Slump of Concrete", and
- ASTM C39, "Test for Compressive Strength of Molded Concrete Cylinders".

PINGP primary construction codes which governed the placement and finishing of concrete included:

- ACI 301-1972, "Specifications for Structural Concrete for Buildings" and
- ACI 304-1972, "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete"

The primary design code for the original concrete structures at PINGP was ACI 318-63. The only major safety related building constructed since initial plant start-up, the D5/D6 Diesel Generator Building, completed in 1992, was designed to the requirements of ACI 349-85, "Code Requirements for Nuclear Safety Related Structures," and ACI 318-83.

Historical document review found no deviations from these codes with the exception of the Shield Buildings. During construction, Shield Building walls were found to be out-of-tolerance as compared to ACI 347. This deviation was verified as acceptable based on structural reanalysis.

Compliance with the above industry code requirements and guidelines ensures that freeze-thaw is not significant as proven by the absence of any significant freeze-thaw degradation.

Additional Information:

Interim Staff Guidance document ISG-03 was one of several ISG guidance documents issued for implementation by the NRC. Under this guidance, the Staff removed the water-to-cement ratio and replaced it with the statement, "subsequent inspections performed did not exhibit degradations related to freeze-thaw." This substitution is consistent with ACI 318, "Durability Requirements" that states, "the f'c specified should be reasonably consistent with the water-cementitious materials ratio required for durability. Selection of an f'c that is consistent with the water-cementitious ratio selected for durability will help ensure that the required water-cementitious materials ratio is actually obtained in the field." In addition, ACI 318 states that the quality and production of concrete must be considered.

2. This subsection addresses cracking due to expansion due to reaction with aggregates for concrete components that could occur at areas that are not accessible for inspection. An evaluation is necessary to determine if cracking due to expansion is significant and requires aging management. NUREG-1801 and NUREG-1800 provide criteria to evaluate plant-specific applicability of cracking due to expansion for inaccessible concrete components.

The following evaluation determined that cracking due to expansion due to reaction with aggregates is not significant for inaccessible concrete components and therefore aging management is not necessary.

PINGP documents confirm tests and petrographic examinations were performed in accordance with C289, "Test for Potential Reactivity of Aggregates". This test verified that aggregates used were not reactive. This evaluation satisfies NUREG-1801 applicability criteria for concrete in inaccessible areas and therefore aging management for cracking due to expansion due to reaction with aggregate is not necessary.

3. PART I

This subsection addresses cracks and distortion due to increased stress levels from settlement for concrete components that could occur in areas that are not accessible for inspection. An evaluation is necessary to determine if these aging effects are significant and requires aging management.

For these aging effects, NUREG-1801 does not include aging effect applicability criteria to evaluate the aging effects on a plant-specific basis. Nevertheless, plant design conditions are such that these aging effects are not expected to be an issue at PINGP.

During foundation investigations conducted by Dames & Moore in the late 1960's, it was determined that soils above elevation 645'-0" could possibly be subject to liquefaction under the postulated maximum credible earthquake. To provide for a suitable margin of safety against liquefaction, the foundation area was dewatered to elevation 642', excavated to elevation 645', and recompacted using the excavated material as fill. The fill was placed in three inch layers and compacted to 100% maximum density as determined by the American Association of State Highway Officials Test Designation T 180 - 57. This corresponds to at least 85% relative density. The fill was replaced and compacted to the appropriate elevations upon which the foundation slabs were placed. The Auxiliary Building, Turbine Building, and Shield Buildings were constructed on a continuous mat foundation with keyed construction joints at building interfaces. The mat provides continuity so that the power house complex acts as a combined unit. Due to the presence of the 30 foot layer of densely compacted materials underlying the foundations, settlement is expected to be uniform and any differential settlement is expected to be negligible. Almost all settlement of foundations on dense granular material results from elastic soil deformation during construction as building weight increases; subsequent time dependent settlement is not expected unless there are underlying layers of silt, clay or mixed soil materials subject to consolidation.

De-watering systems are not used at PINGP and the plant CLB did not credit a de-watering system to lower the site groundwater level. A dewatering system was used during site excavation and soil compaction activities only.

Plant operating history shows no evidence of significant building settlement. Concrete cracks observed to date were determined to be a result of normal shrinkage or other phenomena unrelated to settlement. PINGP soil conditions were strictly controlled as discussed above.

The foundation for the D5/D6 Diesel Generator Building, which was constructed between 1990 and 1992, is independent of the common Turbine, Shield, and Auxiliary Building foundation. The D5/D6 Building is founded on the same compact granular material as are the power block buildings and, like those buildings, is not expected to experience significant time dependent settlement.

To ensure unexpected settlement does not occur, the Structures Monitoring Program manages cracks and distortion due to increased stress levels from settlement. For the inaccessible groundwater soil environment, the concrete condition in accessible areas is used to evaluate the condition of the concrete in inaccessible areas. The NUREG-1801 line item that addresses settlement includes the component “Concrete: All” and the environment “Soil.” “Concrete: All” is assumed to include environments applicable to all concrete components and therefore air indoor, air outdoor, groundwater (accessible) and groundwater/soil environments are considered when evaluating concrete for settlement.

PART II

This subsection addresses reduction in foundation strength, cracking, and differential settlement due to erosion of porous concrete sub-foundation. PINGP does not have porous concrete sub-foundations. Therefore, reduction in foundation strength, cracking, and differential settlement due to erosion of porous concrete sub-foundation are not applicable.

4. This subsection addresses cracking, loss of bond, and loss of material (spalling, scaling) due to corrosion of embedded steel, and increase in porosity and permeability, cracking, loss of material (spalling, scaling) due to aggressive chemical attack for concrete components that could occur in areas that are not accessible for inspection. An evaluation is necessary to determine if these aging effects are significant and requires aging management. NUREG-1801 and NUREG-1800 provide criteria to evaluate plant-specific applicability for these aging effects.

   Note: For the evaluation of these aging effects in areas accessible for inspection, see Further Evaluation Section 3.5.2.2.2.1.

   The following evaluation determined that neither groundwater nor river water contain significant concentrations of aggressive ions. For a non-aggressive environment, NUREG-1801 specifies that the Structures Monitoring Program include examinations of the exposed portions of the below grade concrete when excavated for any reason, and include periodic seasonal monitoring of the below grade water and river water chemistries to verify that aggressive ion concentrations remain below acceptance limits. The Structures Monitoring Program includes examinations of below grade structural members whenever inaccessible areas are excavated, exposed, or modified, and includes periodic monitoring of groundwater and river water chemistries. The Structures Monitoring Program is consistent with NUREG-1801.

   NUREG-1801 criteria for an aggressive environment are as follows.

   - pH < 5.5,
   - Chloride concentration >500 ppm, or
   - Sulfate concentration > 1500 ppm

   PINGP plant envelope chemistry test results:

   - pH ranging from 7.6 to 8.5,
   - Maximum chloride concentration of 89.4 ppm, and
   - Maximum sulfate concentration of 119 ppm

   Since pH, and chloride and sulfate concentrations satisfy NUREG-1801 criteria, the below grade environment at PINGP is not aggressive. In accordance with NUREG-1801 and NUREG-1800, further evaluation to manage increase in porosity and permeability, cracking, loss of material (spalling, scaling) due to aggressive chemical attack, and cracking, loss of bond, and loss of material (spalling, scaling) due to corrosion of embedded steel for concrete components located in inaccessible areas is not required when a non-aggressive environment determination is made. To ensure the environment remains non-aggressive through the period of extended operation, the Structures Monitoring Program includes periodic monitoring of groundwater and river water pH, chlorides and sulfates chemistries to ensure they remain within NUREG parameters. The program includes examinations of inaccessible structural members when excavated, exposed or modified.

The following well water chemistry test results were extracted from Appendix E of the PINGP USAR. These test results were obtained in 1965 by Dames & Moore, Consultants in Applied Earth Science.

PINGP Well Water Chemistry Test Results dated 1965	
Sample Description	**Well Water**
pH	7.7
Chloride (Cl)	10.0 ppm
Sulfate (SO_4)	31.0 ppm

The following river water and well water chemistry test results were taken over a span of 22 years, from 1984 to 2006. The table includes only the maximum chloride and sulfate test results and the minimum and maximum pH test results occurring over the specified time period.

PINGP Well Water and River Water Chemistry Test Results dated 1984 through 2006		
Sample Description	**River Water (Mississippi)**	**Well Water**
pH	7.7 to 8.5	7.6 to 8.2
Chloride (Cl)	89.4 ppm	46.9 ppm
Sulfate (SO_4)	119 ppm	39.2 ppm

5. This subsection addresses increase in porosity and permeability and loss of strength due to leaching of calcium hydroxide for concrete

components that could occur in areas that are accessible for inspection as well as in areas that are not accessible for inspection.

For concrete components in accessible areas, increase in porosity and permeability and loss of strength due to leaching of calcium hydroxide is managed by the Structures Monitoring Program in accordance with NUREG-1801 and NUREG-1800. The Structures Monitoring Program is consistent with NUREG-1801.

For concrete components that are not accessible for inspection, an evaluation is necessary to determine if the aging effects are significant and require aging management. NUREG-1801 and NUREG-1800 provide criteria to evaluate plant-specific applicability of leaching of calcium hydroxide for inaccessible concrete components.

The following evaluation determined that increase in porosity and permeability and loss of strength due to leaching of calcium hydroxide are not significant for concrete components in inaccessible areas and therefore aging management is not necessary.

NUREG specifies that if there is documented evidence that confirms the in-place concrete was constructed in accordance with the recommendations in ACI 201.2R-77, then an AMP is not necessary. PINGP documents confirm that the concrete was constructed in accordance with the recommendations in ACI 201.2R-77, “Guide to Durable Concrete” for durability. Materials used in the mix design and construction practices employed conformed to ASTM Standards and ACI Codes ensuring consistent, reliable concrete of the highest quality. Freeze-thaw and reaction with aggregates evaluations in Section 3.5.2.2.2.2.1 and Section 3.5.2.2.2.2.2 provide a summary of those industry Codes and Standards. Numerous tests were performed including ASTM C143, “Test for Slump of Concrete” and C39, “Test for Compressive Strength of Molded Concrete Cylinders” and other listed in above mentioned subsections. This evaluation satisfies NUREG applicability criteria for concrete in inaccessible areas and therefore aging management for increase in porosity and permeability and loss of strength due to leaching of calcium hydroxide is not necessary.

Additional Information:

The Screenhouse and the D5 / D6 diesel fuel storage tank vault are the only major building structures with foundation basemats and lower walls below the normal groundwater elevation, which is normally about the same as the river surface elevation of 674"-6" (controlled by the dam downstream of the plant). The basemats for the Shield Buildings are above the groundwater level, and the basemats for the Auxiliary and Turbine Buildings are above the groundwater elevation except at pit/sump locations. Concrete inspections documented in PI Report NSPI-12-7175 dated April of 1988, and routine inspections conducted recently did not observe any significant degradation at the Screenhouse intake bay air-to-water line interface or in the pump bay floor and walls that are below groundwater / river level.

3.5.2.2.2.3 Reduction of Strength and Modulus of Concrete Structures due to Elevated Temperature

This subsection addresses reduction of strength and modulus due to the elevated temperature for concrete components. The Shield Building walls adjacent to hot piping penetrations, the Screenhouse and D5/D6 Diesel Generator Building walls and slabs adjacent to non-insulated diesel engine exhaust lines, and the reactor biological shield wall require evaluation for potential aging effects due to elevated temperatures in excess of the NUREG-1801 threshold levels of 150 degrees F general area and 200 degrees F local area. Other areas of the plant do not experience normal operating temperatures in excess of NUREG-1801 threshold levels.

- Shield Building Walls Adjacent to Hot Piping Penetrations

  Main steam and feedwater line penetrations through the Shield Building wall use a flued head configuration that provides a metallic path for conduct of heat from pipe to concrete. Concrete temperatures adjacent to several penetrations were measured. The measurements indicated a maximum concrete temperature (near the top of a main steam line penetration) of 158 degrees F. This temperature was localized and well below the NUREG-1801 local area threshold of 200 degrees F. Therefore, no further evaluation of the Shield Building wall penetrations is required.

- Screenhouse and D5/D6 Diesel Generator Building Walls/Slabs Adjacent to Non-insulated Diesel Engine Exhaust Lines

  Temperatures at the surface of concrete structural elements adjacent to non-insulated diesel exhaust lines have not been measured. Since these may exceed NUREG-1801 threshold levels, aging management is required. Aging management requirements are satisfied by examinations of the heat affected areas in the Screenhouse and D5/D6 Building as directed by the RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program and the Structures Monitoring Program respectively. Both programs are consistent with NUREG-1801. The D1/D2 exhaust lines segments in close proximity to concrete are fully insulated.

- Reactor Biological Shield

  Biological shield temperatures are documented in design calculations. Calculation results show that temperatures are above 150 degrees F across a significant fraction of the shield and that maximum temperature is about 195 degrees F. Since the heat affected part of the shield is internal concrete that is not accessible for examination, an evaluation is required to verify that exposure to the elevated temperature environment will not adversely affect structural integrity.

  The evaluation is based on EPRI TR-103842 which documents the results of research into the effects of elevated temperature and cumulative radiation fluence on concrete properties. Based on the information in the EPRI report, it was concluded that elevated temperature exposure could reduce concrete strength and modulus by as much as 30% and 60%, respectively.

  The shield is designed to attenuate high radiation flux and is quite massive as necessary to accomplish this function. As a result, stresses generated by temperature gradients, normal operating load (the weight of supported structures) and upset condition loads (pressure and high energy line break reactions) are quite small for a concrete structure. Maximum stress, as documented in USAR Table 12.2-34 is 569 psi. The shield is constructed of 4,000 psi design strength concrete. Considering a 30% loss of strength, a 5% reduction in the area of concrete considered capable of carrying load (see discussion in the following paragraph) and a conservative limitation of concrete stress to 0.45 of the reduced strength (the USAR limit for stress under operating load; the limit for upset load stress is 100% of strength) results in an allowable stress of 1,297 psi (4,000 x 0.70 x 0.95 x 0.45). Since, the maximum upset condition stress of 569 psi is less than half of the allowable, the reduced strength is acceptable and no further evaluation is required.

The shield is also subject to high neutron and gamma radiation flux. As discussed in a License Renewal Project Technical Report, high cumulative gamma dose (cumulative neutron fluence is below the level of concern) at the end of plant life and elevated temperature combine to produce an environment adjacent to the inside face of the shield that cannot be evaluated using research results documented in EPRI TR-103842. For this reason, 5% of the shield concrete that is adjacent to the inside face is considered to be ineffective in carrying load. This is accounted for in the evaluation discussed in the previous paragraph.

As noted above, modulus reduction resulting from exposure to elevated temperature may be as great as 60%. However, as the shield is subject to very low stress levels, the additional deflections that result from the lowered modulus are also small and considered to be of no significance relative to the functional requirements imposed on the shield structure. Therefore, no further evaluation of modulus reduction is required.

Aging management requirements are satisfied by examinations of the reactor biological shield as directed by the Structures Monitoring Program.

The Containment Vessel Air Cooling sub-system controls biological shield temperature by removing heat from the surfaces and by limiting conduction of heat from the Reactor Pressure Vessel support pads. Cooling air drawn from the containment fan coil unit discharge ductwork by booster fans is directed through the Reactor Pressure Vessel supports and through the gap between the shield and the vessel. Additional cooling air from the fan coil unit discharge ductwork is directed through the neutron detector wells. Vessel support pad and gap air flows are monitored; low air flow generates a control board alarm.

The Containment Vessel Air Cooling sub-system elements that remove heat from the gap, vessel support pads and neutron detector wells are designed to satisfy the following criteria.

- Remove 25,000 BTU / hour from the inside face of the shield.
- Limit support pad bottom plate (in contact with shield concrete) temperature to a maximum of 150 degrees F.
- Limit neutron detector housing temperature to 135 degrees F.

The exterior surface of the shield is cooled by natural convection of containment air that is maintained at or below 120 degrees F by the Containment Vessel Air Cooling sub-system.

3.5.2.2.2.4 Aging Management of Inaccessible Areas for Group 6 Structures

1. This subsection addresses cracking, loss of bond, and loss of material (spalling, scaling) due to corrosion of embedded steel, and increase in porosity and permeability, cracking, and loss of material (spalling, scaling) due to aggressive chemical attack for Group 6 (Water Control) Concrete that could occur in areas that are accessible for inspection as well as in areas not accessible for inspection.

   For concrete components in accessible areas (i.e. groundwater/ soil (accessible), air outdoor, and air indoor), the aging effects cracking, loss of bond, and loss of material (spalling, scaling) due to corrosion of embedded steel, and increase in porosity and permeability, cracking, and loss of material (spalling, scaling) due to aggressive chemical attack are managed by the RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program in accordance with NUREG-1801 and NUREG-1800. The RG 1.127 Program is consistent with NUREG-1801.

   For concrete components that are not accessible for inspection, an evaluation is necessary to determine if these aging effects are significant and require aging management. This evaluation is the same evaluation documented in Further Evaluation Section 3.5.2.2.2.2.4 which determined that neither groundwater nor river water contain significant concentrations of aggressive ions. For a non-aggressive environment, NUREG-1801 specifies periodic monitoring of groundwater and river water chemistries to verify that aggressive ion concentrations remain below acceptance limits. The Structures Monitoring Program includes this requirement. The Structures Monitoring Program is consistent with NUREG-1801.

2. This subsection addresses loss of material (spalling, scaling) and cracking due to freeze-thaw for Group 6 Concrete that could occur in areas that are accessible for inspection as well as in areas that are not accessible for inspection.

   For concrete components in accessible areas, the aging effects loss of material (spalling, scaling) and cracking due to freeze-thaw are managed by the RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program in accordance with NUREG-1801 and NUREG-1800. The RG 1.127 Program is consistent with NUREG-1801.

For concrete components that are not accessible for inspection, an evaluation is necessary to determine if the aging effects are significant and require aging management. This evaluation is the same evaluation documented in Further Evaluation Section 3.5.2.2.2.2.1 which determined that freeze thaw cycles are not expected to have a significant effect on PINGP concrete. To ensure against freeze-thaw degradation, the potential for effects induced by freeze-thaw cycles on inaccessible concrete is assessed by monitoring accessible areas of concrete structures for evidence of freeze-thaw induced cracking and loss of material. Examinations of accessible surfaces are performed under the RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program.

3. PART I

This subsection addresses cracking due to expansion due to reaction with aggregates for Group 6 Concrete that could occur in areas that are accessible for inspection as well as in areas that are not accessible for inspection.

For concrete components in accessible areas, the aging effect cracking due to expansion due to reaction with aggregates is managed by the RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program in accordance with NUREG-1801 and NUREG-1800. The RG 1.127 Program is consistent with NUREG-1801.

For concrete components that are not accessible for inspection, an evaluation is necessary to determine if the aging effect is significant and requires aging management. This evaluation is the same evaluation documented in Further Evaluation Section 3.5.2.2.2.2.2 which determined that cracking due to expansion due to reaction with aggregates is not significant for inaccessible concrete components and therefore aging management is not necessary.

PART II

This subsection addresses increase in porosity and permeability and loss of strength due to leaching of calcium hydroxide for Group 6

Concrete that could occur in areas that are accessible for inspection as well as in areas that are not accessible for inspection.

For concrete components in accessible areas, increase in porosity and permeability and loss of strength due to leaching of calcium hydroxide are managed by the RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program in accordance with NUREG-1801 and NUREG-1800. The RG 1.127 Program is consistent with NUREG-1801.

For concrete components that are not accessible for inspection, an evaluation is necessary to determine if the aging effects are significant and require aging management. This evaluation is the same evaluation documented in Further Evaluation Section 3.5.2.2.2.2.5 which determined that increase in porosity and permeability and loss of strength due to leaching of calcium hydroxide are not significant for concrete components in inaccessible areas and therefore aging management is not necessary.

3.5.2.2.2.5 **Cracking due to Stress Corrosion Cracking and Loss of Material due to Pitting and Crevice Corrosion**

Liners for concrete and steel tanks are evaluated as mechanical components. The liners for the reinforced concrete refueling water storage tanks are evaluated in Table line Items 3.2.1-49 and 3.2.1-53.

3.5.2.2.2.6 **Aging of Supports Not Covered by Structures Monitoring Program**

PART I

The aging effect loss of material due to corrosion is managed by the Structures Monitoring Program in accordance with NUREG-1801 and NUREG-1800. The Structures Monitoring Program is consistent with NUREG-1801. The program manages support components and other miscellaneous steel components. Pitting corrosion is not applicable at PINGP since the air indoor and air outdoor environments do not contain aggressive contaminants and are not continuously wetted.

PART II

The aging effects reduction in concrete anchor capacity due to local concrete degradation due to service-induced cracking or other concrete aging mechanisms are managed by the Structures Monitoring Program in accordance with NUREG-1801 and NUREG-1800 with two exceptions. Line items III.B1.1-1 (Class 1 supports) and III.B1.2-1 (Class 2 and 3 supports) credit the ASME Section XI, Subsection IWF Program to manage the aging effects instead of the Structures Monitoring Program. The Structures Monitoring Program and the ASME Section XI, Subsection IWF Program are consistent with NUREG-1801.

PART III

An evaluation is not required since the Structures Monitoring Program manages the aging effect reduction or loss of isolation function due to radiation hardening, temperature, humidity, and sustained vibratory loading. The Structures Monitoring Program is consistent with NUREG-1801.

3.5.2.2.2.7 Cumulative Fatigue Damage due to Fatigue

Fatigue of metal Class 1 component supports for the reactor pressure vessels and pressurizers is a TLAA as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). These TLAAs are addressed in Section 4.3 of the LRA. The remaining Class 1 component supports and Class 2/3 component supports do not include a fatigue analysis. These component supports are managed by the ASME Section XI, Subsection IWF Program which looks for evidence of degradation associated with fatigue or other aging mechanisms.

3.5.2.3 Time-Limited Aging Analyses

The TLAAs identified below are associated with the Containments, Structures and Component Supports components. The section of the LRA that contains the TLAA review results is indicated in parenthesis.

- Metal Fatigue (Section 4.3)
- Containment and Penetration Fatigue Analysis (Section 4.6)
- Fatigue Analysis of Cranes (Section 4.7.4)

3.5.3 Conclusion

Structures and Component Supports components that are subject to an AMR have been identified in accordance with the requirements of 10 CFR 54.4. The AMPs selected to manage aging effects for the Structures and Component Supports components are identified in the summary tables and Section 3.5.2.1.

A description of these AMPs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation.

Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the Structures and Component Supports components will be adequately managed so that there is reasonable assurance that the intended function(s) will be maintained consistent with the Current Licensing Basis during the period of extended operation.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
PWR Concrete (Reinforced and Prestressed) and Steel Containments					
BWR Concrete and Steel (Mark I, II, and III) Containments					
3.5.1-01	Concrete elements: walls, dome, basemat, ring girder, buttresses, containment (as applicable)	Aging of accessible and inaccessible concrete areas due to aggressive chemical attack, and corrosion of embedded steel	ISI (IWL) and for inaccessible concrete, an examination of representative samples of below-grade concrete and periodic monitoring of groundwater if the environment is non-aggressive. A plant specific program is to be evaluated if environment is aggressive.	Yes, plant-specific, if the environment is aggressive	Further evaluation is documented in Section 3.5.2.2.1.1.
3.5.1-02	Concrete elements; All	Cracks and distortion due to increased stress levels from settlement	Structures Monitoring Program. If a de-watering system is relied upon for control of settlement, then the licensee is to ensure proper functioning of the de-watering system through the period of extended operation.	Yes, if not within the scope of the applicant's structures monitoring program or a dewatering system is relied upon	Further evaluation is documented in Section 3.5.2.2.1.2.
3.5.1-03	Concrete elements: foundation, sub-foundation	Reduction in foundation strength, cracking, differential settlement due to erosion of porous concrete subfoundation	Structures Monitoring Program If a de-watering system is relied upon to control erosion of cement from porous concrete subfoundations, then the licensee is to ensure proper functioning of the de-watering system through the period of extended operation.	Yes, if not within the scope of the applicant's structures monitoring program or a de-watering system is relied upon	Further evaluation is documented in Section 3.5.2.2.1.2.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-04	Concrete elements: dome, wall, basemat, ring girder, buttresses, containment, concrete fill-in annulus (as applicable)	Reduction of strength and modulus due to elevated temperature	Plant-specific	Yes, plant specific if temperature limits are exceeded	Further evaluation is documented in Section 3.5.2.2.1.3.
3.5.1-05	BWR Only				
3.5.1-06	Steel elements: steel liner, liner anchors, integral attachments	Loss of material due to general, pitting and crevice corrosion	ISI (IWE), and 10 CFR Part 50, Appendix J.	Yes, if corrosion is significant for inaccessible areas	Further evaluation is documented in Section 3.5.2.2.1.4.
3.5.1-07	Prestressed containment tendons	Loss of prestress due to relaxation, shrinkage, creep, and elevated temperature	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Further evaluation is documented in Section 3.5.2.2.1.5.
3.5.1-08	BWR Only				
3.5.1-09	Steel, stainless steel elements, dissimilar metal welds: penetration sleeves, penetration bellows; suppression pool shell, unbraced downcomers	Cumulative fatigue damage (CLB fatigue analysis exists)	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Further evaluation is documented in Section 3.5.2.2.1.6.
3.5.1-10	Stainless steel penetration sleeves, penetration bellows, dissimilar metal welds	Cracking due to stress corrosion cracking	ISI (IWE) and 10 CFR Part 50, Appendix J, and additional examinations/ evaluations for bellows assemblies and dissimilar metal welds.	Yes, detection of aging effects is to be evaluated	Further evaluation is documented in Section 3.5.2.2.1.7.
3.5.1-11	BWR Only				

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-12	Steel, stainless steel elements, dissimilar metal welds: penetration sleeves, penetration bellows; suppression pool shell, unbraced downcomer	Cracking due to cyclic loading	ISI (IWE) and 10 CFR Part 50, Appendix J, and supplemented to detect fine cracks	Yes, detection of aging effects is to be evaluated	Further evaluation is documented in Section 3.5.2.2.1.8.
3.5.1-13	BWR Only				
3.5.1-14	Concrete elements: dome, wall, basemat ring girder, buttresses, containment (as applicable)	Loss of material (Scaling, cracking, and spalling) due to freeze-thaw	ISI (IWL). Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index >100 day-inch/yr) (NUREG-1557).	Yes, for inaccessible areas of plants located in moderate to severe weathering conditions	Further evaluation is documented in Section 3.5.2.2.1.9.
3.5.1-15	Concrete elements: walls, dome, basemat, ring girder, buttresses, containment, concrete fill-in annulus (as applicable).	Increase in porosity, permeability due to leaching of calcium hydroxide; cracking due to expansion and reaction with aggregate	ISI (IWL) for accessible areas. None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 201.2R.	Yes, if concrete was not constructed as stated for inaccessible areas	Further evaluation is documented in Section 3.5.2.2.1.10.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-16	Seals, gaskets, and moisture barriers	Loss of sealing and leakage through containment due to deterioration of joint seals, gaskets, and moisture barriers (caulking, flashing, and other sealants)	ISI (IWE) and 10 CFR Part 50, Appendix J	No	The 10CFR50, Appendix J Program is consistent with NUREG-1801. The ASME Section XI, Subsection IWE Program is consistent with NUREG-1801. The 10 CFR Part 50, Appendix J Program and the ASME Section XI, Subsection IWE Program are credited with managing the aging effects loss of sealing and leakage through containment (i.e. leak tightness of the pressure boundary) of seals, gaskets (including O-rings) and moisture barriers.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-17	Personnel airlock, equipment hatch and CRD hatch locks, hinges, and closure mechanisms	Loss of leak tightness in closed position due to mechanical wear of locks, hinges and closure mechanisms	10 CFR Part 50, Appendix J and Plant Technical Specifications	No	The 10CFR50, Appendix J Program is consistent with NUREG-1801. The 10 CFR Part 50, Appendix J Program is credited with managing the aging effect loss of leak tightness (i.e. leak tightness of the pressure boundary) in the closed position due to mechanical wear of locks, hinges and closure mechanisms for the personnel airlocks. The equipment hatch is closed with a bolted cover and does not utilize locks, hinges or closure mechanisms. Consistent with plant technical specifications, the 10 CFR 50, Appendix J Program specifies tests that monitor leakage through the overall pressure retaining boundary as well as through individual penetration isolation barriers such as personnel airlocks. Note: Control rod drive (CRD) hatches are BWR components and therefore not applicable to PINGP (PWR steel containment).

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-18	Steel penetration sleeves and dissimilar metal welds; personnel airlock, equipment hatch and CRD hatch	Loss of material due to general, pitting, and crevice corrosion	ISI (IWE) and 10 CFR Part 50, Appendix J.	No	The 10CFR50, Appendix J Program is consistent with NUREG-1801. The ASME Section XI, Subsection IWE Program is consistent with NUREG-1801. The ASME Section XI, Subsection IWE Program and the 10 CFR Part 50, Appendix J Program are credited with managing loss of material for penetration sleeves with dissimilar metal welds, personal airlocks, and equipment hatches. NUREG-1801 includes the aging effect and mechanisms loss of material due to general, pitting, and crevice corrosions. Pitting and crevice corrosions are not applicable at PINGP since air indoor and air outdoor environments do not contain aggressive contaminants and are not continuously wetted. Penetration sleeves with dissimilar metal welds, personal airlocks, and equipment hatches provide a fire barrier function and are relied upon as fire barriers. For these components, the ASME Section XI, Subsection IWE Program, 10 CFR Part 50, Appendix J Program, and Fire Protection Program are credited with managing loss of material due to general corrosion. The Fire Protection Program is consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Fire Protection Program implementation.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-19	BWR Only				
3.5.1-20	BWR Only				
3.5.1-21	BWR Only				
3.5.1-22	Prestressed containment: tendons and anchorage components	Loss of material due to corrosion	ISI (IWL)	No	This line item addresses pre-stressed concrete containment and is not applicable to the free standing steel containments at PINGP.
Safety Related and Other Structures; and Component Supports					
3.5.1-23	All Groups except Group 6: interior and above grade exterior concrete	Cracking, loss of bond, and loss of material (spalling, scaling) due to corrosion of embedded steel	Structures Monitoring Program	Yes, if not within the scope of the applicant's structures monitoring program	Further evaluation is documented in Section 3.5.2.2.2.1.
3.5.1-24	All Groups except Group 6: interior and above grade exterior concrete	Increase in porosity and permeability, cracking, loss of material (spalling, scaling) due to aggressive chemical attack	Structures Monitoring Program	Yes, if not within the scope of the applicant's structures monitoring program	Further evaluation is documented in Section 3.5.2.2.2.1.
3.5.1-25	All Groups except Group 6: steel components: all structural steel	Loss of material due to corrosion	Structures Monitoring Program. If protective coatings are relied upon to manage the effects of aging, the structures monitoring program is to include provisions to address protective coating monitoring and maintenance.	Yes, if not within the scope of the applicant's structures monitoring program	Further evaluation is documented in Section 3.5.2.2.2.1.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-26	All Groups except Group 6: accessible and inaccessible concrete: foundation	Loss of material (spalling, scaling) and cracking due to freeze-thaw	Structures Monitoring Program. Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index >100 day-inch/yr) (NUREG-1557).	Yes, if not within the scope of the applicant's structures monitoring program or for inaccessible areas of plants located in moderate to severe weathering conditions	Further evaluation is documented in Section 3.5.2.2.2.1 for loss of material (spalling, scaling) and cracking due to freeze-thaw for accessible areas. Further evaluation is documented in Section 3.5.2.2.2.2.1 for loss of material (spalling, scaling) and cracking due to freeze-thaw for inaccessible areas.
3.5.1-27	All Groups except Group 6: accessible and inaccessible interior/exterior concrete	Cracking due to expansion due to reaction with aggregates	Structures Monitoring Program. None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 201.2R-77.	Yes, if not within the scope of the applicant's structures monitoring program or concrete was not constructed as stated for inaccessible areas	Further evaluation is documented in Section 3.5.2.2.2.1 for cracking due to expansion due to reaction with aggregates for accessible areas. Further evaluation is documented in Section 3.5.2.2.2.2.2 for cracking due to expansion due to reaction with aggregates for inaccessible areas.
3.5.1-28	Groups 1-3, 5-9: All	Cracks and distortion due to increased stress levels from settlement	Structures Monitoring Program. If a de-watering system is relied upon for control of settlement, then the licensee is to ensure proper functioning of the de-watering system through the period of extended operation.	Yes, if not within the scope of the applicant's structures monitoring program or a de-watering system is relied upon	Further evaluation is documented in Section 3.5.2.2.2.1 for cracks and distortion due to increased stress levels from settlement for accessible areas. Further evaluation is documented in Section 3.5.2.2.2.2.3 PART I for cracks and distortion due to increased stress levels from settlement for inaccessible areas.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-29	Groups 1-3, 5-9: foundation	Reduction in foundation strength, cracking, differential settlement due to erosion of porous concrete subfoundation	Structures Monitoring Program. If a de-watering system is relied upon for control of settlement, then the licensee is to ensure proper functioning of the de-watering system through the period of extended operation.	Yes, if not within the scope of the applicant's structures monitoring program or a de-watering system is relied upon	Further evaluation is documented in Section 3.5.2.2.2.1 for reduction in foundation strength, cracking, differential settlement due to erosion of porous concrete subfoundation for accessible areas. Further evaluation is documented in Section 3.5.2.2.2.2.3 PART II for reduction in foundation strength, cracking, differential settlement due to erosion of porous concrete subfoundation for inaccessible areas.
3.5.1-30	Group 4: Radial beam seats in BWR drywell; RPV support shoes for PWR with nozzle supports; Steam generator supports	Lock-up due to wear	ISI (IWF) or Structures monitoring Program	Yes, if not within the scope of ISI or structures monitoring program	Further evaluation is documented in Section 3.5.2.2.2.1.
3.5.1-31	Groups 1-3, 5, 7-9: below-grade concrete components, such as exterior walls below grade and foundation	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack; Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program; Examination of representative samples of below-grade concrete, and periodic monitoring of groundwater, if the environment is non-aggressive. A plant specific program is to be evaluated if environment is aggressive.	Yes, plant-specific, if environment is aggressive	Further evaluation is documented in Section 3.5.2.2.2.2.4.
3.5.1-32	Groups 1-3, 5, 7-9: exterior above and below grade reinforced concrete foundations	Increase in porosity and permeability, and loss of strength due to leaching of calcium hydroxide	Structures monitoring Program for accessible areas. None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 201.2R-77.	Yes, if concrete was not constructed as stated for inaccessible areas	Further evaluation is documented in Section 3.5.2.2.2.2.5.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-33	Groups 1-5: concrete	Reduction of strength and modulus due to elevated temperature	Plant-specific	Yes, plant-specific if temperature limits are exceeded	Further evaluation is documented in Section 3.5.2.2.2.3.
3.5.1-34	Group 6: Concrete; all	Cracking, loss of bond, loss of material due to corrosion of embedded steel; increase in porosity and permeability, cracking, loss of material due to aggressive chemical attack	Inspection of Water-Control Structures Assoc with Nuclear Power Plants and for inaccessible concrete, exam of rep. samples of below-grade concrete, and periodic monitoring of groundwater, if environment is non-aggressive. Plant specific if environment is aggressive.	Yes, plant-specific if environment is aggressive	Further evaluation is documented in Section 3.5.2.2.2.4.1.
3.5.1-35	Group 6: exterior above and below grade concrete foundation	Loss of material (spalling, scaling) and cracking due to freeze-thaw	Inspection of Water-Control Structures Associated with Nuclear Power Plants. Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index >100 day-inch/yr) (NUREG-1557).	Yes, for inaccessible areas of plants located in moderate to severe weathering conditions	Further evaluation is documented in Section 3.5.2.2.2.4.2.
3.5.1-36	Group 6: all accessible/ inaccessible reinforced concrete	Cracking due to expansion/ reaction with aggregates	Accessible areas: Inspection of Water-Control Structures Associated with Nuclear Power Plants. None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 201.2R-77.	Yes, if concrete was not constructed as stated for inaccessible areas	Further evaluation is documented in Section 3.5.2.2.2.4.3 PART I.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-37	Group 6: exterior above and below grade reinforced concrete foundation interior slab	Increase in porosity and permeability, loss of strength due to leaching of calcium hydroxide	For accessible areas, inspection of Water-Control Structures Associated with Nuclear Power Plants. None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 201.2R-77.	Yes, if concrete was not constructed as stated for inaccessible areas	Further evaluation is documented in Section 3.5.2.2.2.4.3 PART II.
3.5.1-38	Groups 7, 8: Tank liners	Cracking due to stress corrosion cracking; loss of material due to pitting and crevice corrosion	Plant-specific	Yes, plant-specific	These are mechanical items. Further evaluation is documented in Section 3.5.2.2.2.5.
3.5.1-39	Support members; welds; bolted connections; support anchorage to building structure	Loss of material due to general and pitting corrosion	Structures Monitoring Program	Yes, if not within the scope of the applicant's structures monitoring program	Further evaluation is documented in Section 3.5.2.2.2.6 PART I.
3.5.1-40	Building concrete at locations of expansion and grouted anchors; grout pads for support base plates	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	Yes, if not within the scope of the applicant's structures monitoring program	Further evaluation is documented in Section 3.5.2.2.2.6 PART II.
3.5.1-41	Vibration isolation elements	Reduction or loss of isolation function/ radiation hardening, temperature, humidity, sustained vibratory loading	Structures Monitoring Program	Yes, if not within the scope of the applicant's structures monitoring program	Further evaluation is documented in Section 3.5.2.2.2.6 PART III.
3.5.1-42	Groups B1.1, B1.2, and B1.3: support members: anchor bolts, welds	Cumulative fatigue damage (CLB fatigue analysis exists)	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Further evaluation is documented in Section 3.5.2.2.2.7.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-43	Groups 1-3, 5, 6: all masonry block walls	Cracking due to restraint shrinkage, creep, and aggressive environment	Masonry Wall Program	No	The Masonry Wall Program is consistent with NUREG-1801. The Masonry Wall Program is credited with managing the aging effect cracking due to restraint shrinkage, creep, and aggressive environment for safety related masonry block walls. Some safety related masonry block walls provide a fire barrier function and are relied upon as fire barriers. For these masonry block walls, both the Masonry Wall Program and Fire Protection Program are credited with managing cracking due to restraint shrinkage, creep, and aggressive environment. The Fire Protection Program is consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Fire Protection Program implementation. Some non-safety related masonry block walls support equipment that is relied upon to perform a function that demonstrates compliance with a regulated event in accordance with 10 CFR 54.4 (a)(3). For these masonry block walls, the Structures Monitoring Program and/or Fire Protection Program are credited with managing cracking due to restraint shrinkage, creep, and aggressive environment. The Structures Monitoring Program is consistent with NUREG-1801.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-44	Group 6 elastomer seals, gaskets, and moisture barriers	Loss of sealing due to deterioration of seals, gaskets, and moisture barriers (caulking, flashing, and other sealants)	Structures Monitoring Program	No	The Structures Monitoring Program is consistent with NUREG-1801. The Structures Monitoring Program is credited with managing the aging effect loss of sealing for elastomer seals and gaskets.
3.5.1-45	Group 6: exterior above and below grade concrete foundation; interior slab	Loss of material due to abrasion, cavitation	Inspection of Water-Control Structures Associated with Nuclear Power Plants	No	The RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program is consistent with NUREG-1801. The RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program is credited with managing the aging effect loss of material due to abrasion and cavitation for the specified components. Abrasion and cavitation for concrete in a groundwater/ soil environment are not applicable since groundwater flow is significantly less than what is needed to result in loss of material.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-46	Group 5: Fuel pool liners	Cracking due to stress corrosion cracking; loss of material due to pitting and crevice corrosion	Water Chemistry and Monitoring of spent fuel pool water level and level of fluid in the leak chase channels.	No	The Water Chemistry Program is consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Water Chemistry Program implementation. The Water Chemistry Program is credited with managing the aging effect loss of material due to crevice corrosion for the spent fuel pool liner, transfer canal liner, refueling cavity liner, fuel handling system components, spent fuel storage racks and miscellaneous supports. Loss of material due to pitting corrosion of these stainless steel components in a treated borated water environment is not applicable at PINGP since chloride, fluoride, and sulfate concentrations do not exceed 150 ppb. Cracking due to SCC of stainless steel components in a treated borated water environment is not applicable at PINGP since refueling cavity, fuel transfer canal and spent fuel pool treated borated water temperatures do not exceed industry limiting temperature of 140 degrees F. The Structures Monitoring Program manages the aging effects cracking due to stress corrosion cracking and loss of material due to pitting and crevice corrosions for stainless steel sump liners rather then the Water Chemistry Program since water quality in the sumps is not routinely monitored. The Structures Monitoring Program is consistent with NUREG-1801.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-46 (con't)					Plant and industry operating experience identify instances of leakage through the stainless steel liners of the refueling cavities and spent fuel pools. The Water Chemistry Program is supplemented by monitoring of the spent fuel pool water level in accordance with Technical Specifications. Additionally, plant procedures require periodic monitoring of the spent fuel pool leak detection system.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-47	Group 6: all metal structural members	Loss of material due to general (steel only), pitting and crevice corrosion	Inspection of Water-Control Structures Associated with Nuclear Power Plants. If protective coatings are relied upon to manage aging, protective coating monitoring and maintenance provisions should be included.	No	The RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program is consistent with NUREG-1801. The RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program is credited with managing loss of material due to general corrosion for steel components. No copper structural components were determined to be in scope of License Renewal. NUREG-1801 includes the aging effect loss of material due to general, pitting, and crevice corrosions. Pitting and crevice corrosions are not applicable at PINGP since air indoor and air outdoor environments do not contain aggressive contaminants and are not continuously wetted. For components inaccessible for inspection (i.e. located in a groundwater/soil environment) the Structures Monitoring Program manages loss of material. The program requires examinations of buried components whenever the surrounding soil is excavated. Observed condition of excavated items is used as a basis for evaluating the condition of inaccessible items. The Structures Monitoring Program is consistent with NUREG-1801.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-48	Group 6: earthen water control structures - dams, embankments, reservoirs, channels, canals, and ponds	Loss of material, loss of form due to erosion, settlement, sedimentation, frost action, waves, currents, surface runoff, seepage	Inspection of Water-Control Structures Associated with Nuclear Power Plants	No	The RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program is consistent with NUREG-1801. The RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program is credited with managing the aging effects loss of material and loss of form due to erosion, settlement, sedimentation, frost action, waves, currents, surface runoff, and seepage for earthen water control structures including embankments and dredged channels.
3.5.1-49	BWR Only				
3.5.1-50	Groups B2, and B4: galvanized steel, aluminum, stainless steel support members; welds; bolted connections; support anchorage to building structure	Loss of material due to pitting and crevice corrosion	Structures Monitoring Program	No	This line item is not applicable to PINGP for this component/ material/ environment combination. NUREG-1801 line item includes the aging effect loss of material due to pitting and crevice corrosions. Loss of material due to pitting and crevice corrosions for stainless steel and aluminum in an air outdoor environment is not applicable at PINGP since the air outdoor environment does not contain aggressive contaminants and is not continuously wetted. Note: Galvanized steel material at PINGP is conservatively assumed to be non-galvanized for aging management purposes.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-51	Group B1.1: high strength low-alloy bolts	Cracking due to stress corrosion cracking; loss of material due to general corrosion	Bolting Integrity	No	The Bolting Integrity Program is consistent with NUREG-1801 with exception. Exceptions apply to NUREG-1801 recommendations for the Bolting Integrity Program implementation. The Bolting Integrity Program is credited with managing the aging effects cracking due to stress corrosion cracking and loss of material due to general corrosion for the high strength support bolts of the Unit 2 steam generators and the Units 1 and 2 reactor coolant pumps. The Unit 1 steam generator support bolts were replaced as part of the Unit 1 Steam Generator Replacement Project. Bolts are now A193 Gr. B7 material with a yield strength of 117 ksi based on actual test results of procured material. Material with a yield strength of 117 ksi is not susceptible to cracking due to stress corrosion cracking (SCC) since SCC is linked to material with a yield strength in excess of 150 ksi.
3.5.1-52	Groups B2, and B4: sliding support bearings and sliding support surfaces	Loss of mechanical function due to corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	Structures Monitoring Program	No	The Structures Monitoring Program is consistent with NUREG-1801. The Structures Monitoring Program is credited with managing the aging effect loss of mechanical function for sliding support bearings and sliding support surfaces for Groups B2 and B4 components.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-53	Groups B1.1, B1.2, and B1.3: support members: welds; bolted connections; support anchorage to building structure	Loss of material due to general and pitting corrosion	ISI (IWF)	No	The ASME Section XI, Subsection IWF Program is consistent with NUREG-1801. The ASME Section XI, Subsection IWF Program is credited with managing the aging effect loss of material for Groups B1.1 and B1.2 components. NUREG-1801 includes the aging effect loss of material due to general and pitting corrosions. Pitting corrosion is not applicable at PINGP since air indoor and air outdoor environments do not contain aggressive contaminants and are not continuously wetted. Note: Group B1.3 refers to Class MC supports (BWR containment) and therefore not applicable to PINGP (PWR steel containment).
3.5.1-54	Groups B1.1, B1.2, and B1.3: Constant and variable load spring hangers; guides; stops	Loss of mechanical function due to corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	ISI (IWF)	No	The ASME Section XI, Subsection IWF Program is consistent with NUREG-1801. The ASME Section XI, Subsection IWF Program is credited with managing the aging effect loss of mechanical function due to corrosion, distortion, dirt, overload, and fatigue due to vibratory and cyclic thermal loads for Groups B1.1 and B1.2 components. Note: Group B1.3 refers to Class MC supports (BWR containment) and therefore not applicable to PINGP (PWR steel containment).

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-55	Steel, galvanized steel, and aluminum support members; welds; bolted connections; support anchorage to building structure	Loss of material due to boric acid corrosion	Boric Acid Corrosion	No	The Boric Acid Corrosion Program is consistent with NUREG-1801. The Boric Acid Corrosion Program is credited with managing the aging effect loss of material due to boric acid corrosion for steel and aluminum support members, welds, bolted connections and support anchorage to building structures. The Boric Acid Corrosion Program is also credited with managing loss of material due to boric acid corrosion for various other steel components. Note: Galvanized steel material at PINGP is conservatively assumed to be non-galvanized for aging management purposes.
3.5.1-56	Groups B1.1, B1.2, and B1.3: Sliding surfaces	Loss of mechanical function due to corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	ISI (IWF)	No	The ASME Section XI, Subsection IWF Program is consistent with NUREG-1801. The ASME Section XI, Subsection IWF Program is credited with managing the aging effect loss of mechanical function for sliding support surfaces of Groups B1.1 and B1.2 components such as the component cooling heat exchangers. Note: Group B1.3 refers to Class MC supports (BWR containment) and therefore not applicable to PINGP (PWR steel containment).

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-57	Groups B1.1, B1.2, and B1.3: Vibration isolation elements	Reduction or loss of isolation function/ radiation hardening, temperature, humidity, sustained vibratory loading	ISI (IWF)	No	The ASME Section XI, Subsection IWF Program is consistent with NUREG-1801. The ASME Section XI, Subsection IWF Program is credited with managing the aging effect reduction or loss of isolation function due to radiation hardening, temperature, humidity, and sustained vibratory loading for Group B1.2 components. There are no Group B1.1 components which utilize vibration isolation elements. Note: Group B1.3 refers to Class MC supports (BWR containment) and therefore not applicable to PINGP (PWR steel containment).
3.5.1-58	Galvanized steel and aluminum support members; welds; bolted connections; support anchorage to building structure exposed to air -indoor uncontrolled	None	None	NA - No AEM or AMP	Aluminum support members, welds, bolted connections, and support anchorage to building structures and miscellaneous aluminum components are not susceptible to aging in an air indoor environment. Therefore aging management is not required. Galvanized steel material at PINGP is conservatively assumed to be non-galvanized steel for aging management purposes. Therefore NUREG-1801 line items that refer to galvanized material were not used.
3.5.1-59	Stainless steel support members; welds; bolted connections; support anchorage to building structure	None	None	NA - No AEM or AMP	Stainless steel supports and stainless steel components are not susceptible to aging in air indoor and air with borated water leakage environments. Therefore aging management is not required.

Table 3.5.2-1 Structures and Component Supports - Auxiliary and Turbine Buildings - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (embedded members)	Structural support	Steel	Embedded in concrete	None	None	II.A2-9 (C-09)	3.5.1-06	C
Concrete (beams, columns, curbs, equipment foundations, slabs, walls, refueling water storage tanks, fuel pool & enclosure, pipe restraint blocks, shield blocks)	Direct flow, flood barrier, HELB shielding, missile barrier, shielding, structural support	Reinforced concrete, unreinforced concrete	Air indoor	None	None	III.A3-1 (T-10)	3.5.1-33	E
Concrete (beams, columns, curbs, equipment foundations, slabs, walls, refueling water storage tanks, fuel pool & enclosure, pipe restraint blocks, shield blocks)	Direct flow, flood barrier, HELB shielding, missile barrier, shielding, structural support	Reinforced concrete, unreinforced concrete	Air indoor	Cracking due to expansion/ reaction with aggregates	Structures Monitoring Program	III.A3-2 (T-03)	3.5.1-27	A
Concrete (foundations, walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	None	None	III.A3-2 (T-03)	3.5.1-27	A

Table 3.5.2-1 Structures and Component Supports - Auxiliary and Turbine Buildings - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (slabs, walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Cracking due to expansion/ reaction with aggregates	Structures Monitoring Program	III.A3-2 (T-03)	3.5.1-27	A
Concrete (beams, columns, curbs, equipment foundations, slabs, walls, refueling water storage tanks, fuel pool & enclosure, pipe restraint blocks, shield blocks)	Direct flow, flood barrier, HELB shielding, missile barrier, shielding, structural support	Reinforced concrete, unreinforced concrete	Air indoor	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A3-3 (T-08)	3.5.1-28	A, 1
Concrete (foundations, walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A3-3 (T-08)	3.5.1-28	A, 1
Concrete (slabs, walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A3-3 (T-08)	3.5.1-28	A, 1
Concrete (foundations, walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A3-4 (T-05)	3.5.1-31	A

Table 3.5.2-1 Structures and Component Supports - Auxiliary and Turbine Buildings - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (foundations, walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A3-5 (T-07)	3.5.1-31	A
Concrete (foundations, walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	Loss of material (spalling, scaling) and cracking/ freeze-thaw	Structures Monitoring Program	III.A3-6 (T-01)	3.5.1-26	A
Concrete (slabs, walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Loss of material (spalling, scaling) and cracking/ freeze-thaw	Structures Monitoring Program	III.A3-6 (T-01)	3.5.1-26	A
Concrete (foundations, walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	None	None	III.A3-7 (T-02)	3.5.1-32	A
Concrete (slabs, walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide	Structures Monitoring Program	III.A3-7 (T-02)	3.5.1-32	A

Table 3.5.2-1 Structures and Component Supports - Auxiliary and Turbine Buildings - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (foundations, subfoundations)	Flood barrier, shelter protection, structural support	Reinforced concrete, porous concrete	Groundwater/ soil	None	None	III.A3-8 (T-09)	3.5.1-29	A
Concrete (beams, columns, curbs, equipment foundations, slabs, walls, refueling water storage tanks, fuel pool & enclosure, pipe restraint blocks, shield blocks)	Direct flow, flood barrier, HELB shielding, missile barrier, shielding, structural support	Reinforced concrete, unreinforced concrete	Air indoor	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A3-9 (T-04)	3.5.1-23	A
Concrete (slabs, walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A3-9 (T-04)	3.5.1-23	A
Concrete (beams, columns, curbs, equipment foundations, slabs, walls, refueling water storage tanks, fuel pool & enclosure, pipe restraint blocks, shield blocks)	Direct flow, flood barrier, HELB shielding, missile barrier, shielding, structural support	Reinforced concrete, unreinforced concrete	Air indoor	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A3-10 (T-06)	3.5.1-24	A

Table 3.5.2-1 Structures and Component Supports - Auxiliary and Turbine Buildings - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (slabs, walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A3-10 (T-06)	3.5.1-24	A
Masonry walls	Fire barrier	Concrete block	Air indoor	Cracking/ restraint, shrinkage, creep, and aggressive environment	Fire Protection Program	III.A3-11 (T-12)	3.5.1-43	E, 30
Masonry walls	Fire barrier	Concrete block	Air outdoor	Cracking/ restraint, shrinkage, creep, and aggressive environment	Fire Protection Program	III.A3-11 (T-12)	3.5.1-43	E, 30
Masonry walls	Fire barrier, flood barrier, HELB shielding, missile barrier, shielding, structural support	Concrete block	Air indoor	Cracking/ restraint, shrinkage, creep, and aggressive environment	Fire Protection Program	III.A3-11 (T-12)	3.5.1-43	E
Masonry walls	Fire barrier, flood barrier, HELB shielding, missile barrier, shielding, structural support	Concrete block	Air indoor	Cracking/ restraint, shrinkage, creep, and aggressive environment	Masonry Wall Program	III.A3-11 (T-12)	3.5.1-43	A

Table 3.5.2-1 Structures and Component Supports - Auxiliary and Turbine Buildings - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Masonry walls	Structural support	Concrete block	Air outdoor	Cracking/ restraint, shrinkage, creep, and aggressive environment	Structures Monitoring Program	III.A3-11 (T-12)	3.5.1-43	E, 30
Steel components (structural steel members, connections, and anchorage for embedded steel, doors, bulkhead doors/panels)	Flood barrier, shelter protection, structural support	Steel	Air outdoor	Loss of material/ corrosion	Structures Monitoring Program	III.A3-12 (T-11)	3.5.1-25	A, 31
Steel components (structural steel members, connections, and anchorage for main load carrying structural steel frame, embedded steel, pipe sleeves, curbs, doors, fuel pool cover, sump covers)	Direct flow, flood barrier, gaseous release path, HELB shielding, shielding, structural support	Steel	Air indoor	Loss of material/ corrosion	Structures Monitoring Program	III.A3-12 (T-11)	3.5.1-25	A, 31
Stainless steel components (spent fuel pool liner, transfer canal liner)	Flood barrier, structural support	Stainless steel	Treated borated water	Loss of material/ crevice corrosion	Water Chemistry Program Monitoring of the spent fuel pool water level in accordance with Technical Specifications. Monitoring leakage from the leak chase channels.	III.A5-13 (T-14)	3.5.1-46	B, 10, 15

Table 3.5.2-1 Structures and Component Supports - Auxiliary and Turbine Buildings - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Stainless steel components (spent fuel storage racks)	Structural support	Stainless steel	Treated borated water	Loss of material/ crevice corrosion	Water Chemistry Program	III.A5-13 (T-14)	3.5.1-46	D, 10
Stainless steel components (sump liners)	Structural support	Stainless steel	Treated borated water	Cracking/ stress corrosion cracking; loss of material/ pitting and crevice corrosion	Structures Monitoring Program	III.A5-13 (T-14)	3.5.1-46	E, 16
Elastomers (seismic gap seals)	Expansion/ separation, flood barrier	Elastomers	Air indoor	Loss of sealing/ deterioration of seals, gaskets, and moisture barriers	Structures Monitoring Program	III.A6-12 (TP-07)	3.5.1-44	C
Elastomers (seismic gap seals, flood door/ panel/ penetration seals)	Expansion/ separation, flood barrier, shelter protection	Elastomers	Air outdoor	Loss of sealing/ deterioration of seals, gaskets, and moisture barriers	Structures Monitoring Program	III.A6-12 (TP-07)	3.5.1-44	C
Aluminum (hatch over concrete roof plug)	Shelter protection	Aluminum	Air outdoor	None	None	III.B2-7 (TP-06)	3.5.1-50	I, 13, 14
Stainless steel components (structural steel members, connections, and anchorage for bulkheads doors/panels)	Flood barrier, shelter protection, structural support	Stainless steel	Air outdoor	None	None	III.B2-7 (TP-06)	3.5.1-50	I, 14

Table 3.5.2-1 Structures and Component Supports - Auxiliary and Turbine Buildings - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (building concrete at locations of expansion and grouted anchors; grout pads for support base plates for platforms, stairs, ladders, cages, jet impingement shields, pipe whip restraints, masonry wall restraints, and other miscellaneous structures)	Structural support	Reinforced concrete, grout	Air indoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	III.B5-1 (T-29)	3.5.1-40	A
Support (members for control room ceiling)	Structural support	Aluminum	Air indoor	None	None	III.B5-2 (TP-08)	3.5.1-58	A

Table 3.5.2-1 Structures and Component Supports - Auxiliary and Turbine Buildings - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Stainless steel components (members, connections, and anchorage for pipe sleeves, new fuel storage rack assembly, transfer canal liner, spent fuel pool liner, sump liners, curbs, flow deflectors, misc. components)	Direct flow, flood barrier, shielding, structural support	Stainless steel	Air indoor	None	None	III.B5-5 (TP-05)	3.5.1-59	C
Support (members, connections, and anchorage to building structure for miscellaneous structures)	HELB shielding, pipe whip restraint, structural support	Stainless steel	Air indoor	None	None	III.B5-5 (TP-05)	3.5.1-59	A

Table 3.5.2-1 Structures and Component Supports - Auxiliary and Turbine Buildings - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Stainless steel components (members, connections, and anchorage for pipe sleeves, new fuel storage rack assembly, transfer canal liner, spent fuel pool liner, sump liners, curbs, flow deflectors, misc. components)	Direct flow, flood barrier, shielding, structural support	Stainless steel	Air with borated water leakage	None	None	III.B5-6 (TP-04)	3.5.1-59	C
Support (members, connections, and anchorage to building structure for miscellaneous structures)	HELB shielding, pipe whip restraint, structural support	Stainless steel	Air with borated water leakage	None	None	III.B5-6 (TP-04)	3.5.1-59	A

Table 3.5.2-1 Structures and Component Supports - Auxiliary and Turbine Buildings - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for platforms, stairs, ladders, cages, jet impingement shields, pipe whip restraints, masonry wall restraints, control room ceiling and floor system supports, and other miscellaneous structures)	HELB shielding, pipe whip restraint, structural support	Steel	Air indoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B5-7 (T-30)	3.5.1-39	A, 7, 31
Steel components (structural steel members, connections, and anchorage for main load carrying structural steel frame, embedded steel, pipe sleeves, curbs, doors, fuel pool cover, sump covers)	Direct flow, flood barrier, gaseous release path, HELB shielding, shielding, structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B5-8 (T-25)	3.5.1-55	C, 31

Table 3.5.2-1 Structures and Component Supports - Auxiliary and Turbine Buildings - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for platforms, stairs, ladders, cages, jet impingement shields, pipe whip restraints, masonry wall restraints, and other miscellaneous structures)	HELB shielding, pipe whip restraint, structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B5-8 (T-25)	3.5.1-55	A, 31
Concrete (slabs, walls, fuel pool enclosure)	Fire barrier	Reinforced concrete	Air indoor	Concrete cracking and spalling/ aggressive chemical attack, and reaction with aggregates	Fire Protection Program	VII.G-28 (A-90)	3.3.1-65	B
Concrete (slabs, walls, fuel pool enclosure)	Fire barrier	Reinforced concrete	Air indoor	Concrete cracking and spalling/ aggressive chemical attack, and reaction with aggregates	Structures Monitoring Program	VII.G-28 (A-90)	3.3.1-65	A
Concrete (slabs, walls, fuel pool enclosure)	Fire barrier	Reinforced concrete	Air indoor	Loss of material/ corrosion of embedded steel	Fire Protection Program	VII.G-29 (A-91)	3.3.1-67	B
Concrete (slabs, walls, fuel pool enclosure)	Fire barrier	Reinforced concrete	Air indoor	Loss of material/ corrosion of embedded steel	Structures Monitoring Program	VII.G-29 (A-91)	3.3.1-67	A

Table 3.5.2-1 Structures and Component Supports - Auxiliary and Turbine Buildings - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air outdoor	Concrete cracking and spalling/ freeze-thaw, aggressive chemical attack, and reaction with aggregates	Fire Protection Program	VII.G-30 (A-92)	3.3.1-66	B
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air outdoor	Concrete cracking and spalling/ freeze-thaw, aggressive chemical attack, and reaction with aggregates	Structures Monitoring Program	VII.G-30 (A-92)	3.3.1-66	A
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air outdoor	Loss of material/ corrosion of embedded steel	Fire Protection Program	VII.G-31 (A-93)	3.3.1-67	B
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air outdoor	Loss of material/ corrosion of embedded steel	Structures Monitoring Program	VII.G-31 (A-93)	3.3.1-67	A
Stainless steel components (embedded members)	Structural support	Stainless steel	Embedded in concrete	None	None	VII.J-17 (AP-19)	3.3.1-96	C
Ceramic (breakaway door pins)	Pressure relief	Ceramic	Air indoor	None	None			J, 9
Roofing (auxiliary building roof)	Shelter protection	Built-up roofing composite	Air outdoor	Separation, environmental degradation, water in-leakage/ weathering	Structures Monitoring Program			J, 6

Table 3.5.2-1 Structures and Component Supports - Auxiliary and Turbine Buildings - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Wood (new fuel rack base support system)	Shelter protection	Wood	Air indoor	None	None			J, 12

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Supports (RPV support shoes for PWR with nozzle supports)	Structural support	Lubrite or graphitic tool steel	Air indoor	Lockup/ wear	ASME Section XI, Subsection IWF Program	III.A4-6 (T-13)	3.5.1-30	A
Support (members, connections, and anchorage to building structure for ASME/ non-ASME supports in refueling cavity, fuel transfer canal and spent fuel pool)	Structural support	Stainless steel	Treated borated water	Loss of material/ crevice corrosion	Water Chemistry Program	III.A5-13 (T-14)	3.5.1-46	D, 10
Support (submerged members, connections, and anchorage to building structure for safeguards screens, safeguards bay gates and other Screenhouse SSC)	Structural support	Steel	Groundwater/ soil (accessible)	Loss of material/ general, pitting, crevice, and microbiologically influenced corrosion	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-11 (T-21)	3.5.1-47	C, 3, 5, 31

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (building concrete at locations of expansion and grouted anchors, grout pads for support base plates, and embedded support plates/ structural shapes for Class 1 vessels, exchangers, pumps, valves, piping and miscellaneous equipment items)	Structural support	Reinforced concrete, grout	Air indoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	ASME Section XI, Subsection IWF Program	III.B1.1-1 (T-29)	3.5.1-40	E
Support (constant and variable load spring hangers, guides and stops for Class 1 vessels, exchangers, pumps, valves, piping and miscellaneous equipment items)	Structural support	Steel	Air indoor	Loss of mechanical function/ corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	ASME Section XI, Subsection IWF Program	III.B1.1-2 (T-28)	3.5.1-54	A
Support (high strength bolts for Unit 2 steam generators and Units 1 and 2 reactor coolant pumps)	Structural support	Steel (low alloy, yield strength > 150 ksi)	Air indoor	Cracking/ stress corrosion cracking	Bolting Integrity Program	III.B1.1-3 (T-27)	3.5.1-51	B, 17

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (high strength bolts for Unit 2 steam generators and Units 1 and 2 reactor coolant pumps)	Structural support	Steel (low alloy, yield strength > 150 ksi)	Air indoor	Loss of material/ general corrosion	Bolting Integrity Program	III.B1.1-4 (TP-09)	3.5.1-51	B, 17
Supports (sliding surfaces for Class 1 piping and components)	Structural support	Lubrite or graphitic tool steel	Air indoor	Loss of mechanical function/ corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	ASME Section XI, Subsection IWF Program	III.B1.1-5 (T-32)	3.5.1-56	A
Support (members, connections, and anchorage to building structure for Class 1 vessels, exchangers, pumps, valves, piping, insulation and miscellaneous equipment items)	Structural support	Stainless steel	Air indoor	None	None	III.B1.1-9 (TP-05)	3.5.1-59	A

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for Class 1 vessels, exchangers, pumps, valves, piping, insulation and miscellaneous equipment items)	Structural support	Stainless steel	Air with borated water leakage	None	None	III.B1.1-10 (TP-04)	3.5.1-59	A
Support (members, connections, and anchorage to building structure for Class 1 supports)	Structural support	Steel	Air indoor	Cumulative fatigue damage / fatigue	TLAA (Section 4.3.1.1 and Section 4.3.1.3)	III.B1.1-12 (T-26)	3.5.1-42	A
Support (members, connections, and anchorage to building structure for Class 1 vessels, exchangers, pumps, valves, piping, insulation and miscellaneous equipment items)	Structural support	Steel	Air indoor	Loss of material/ general corrosion	ASME Section XI, Subsection IWF Program	III.B1.1-13 (T-24)	3.5.1-53	A, 7, 31

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for Class 1 vessels, exchangers, pumps, valves, piping, insulation and miscellaneous equipment items)	Structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B1.1-14 (T-25)	3.5.1-55	A, 31
Support (building concrete at locations of expansion and grouted anchors, grout pads for support base plates, and embedded support plates/ structural shapes Class 2/ 3 vessels, exchangers, pumps, valves, piping and miscellaneous equipment items)	Structural support	Reinforced concrete, grout	Air indoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	ASME Section XI, Subsection IWF Program	III.B1.2-1 (T-29)	3.5.1-40	E

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (building concrete at locations of expansion and grouted anchors, grout pads for support base plates, and embedded support plates/ structural shapes for Class 2/ 3 valves, piping and miscellaneous equipment items in condensate storage tank areas)	Structural support	Reinforced concrete, grout	Air outdoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	ASME Section XI, Subsection IWF Program	III.B1.2-1 (T-29)	3.5.1-40	E
Support (constant and variable load spring hangers, guides and stops for Class 2/ 3 vessels, exchangers, pumps, valves, piping and miscellaneous equipment items)	Structural support	Steel	Air indoor	Loss of mechanical function/ corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	ASME Section XI, Subsection IWF Program	III.B1.2-2 (T-28)	3.5.1-54	A

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (constant and variable load spring hangers, guides and stops for Class 2/ 3 vessels, exchangers, pumps, valves, piping and miscellaneous equipment items)	Structural support	Steel	Air outdoor	Loss of mechanical function/ corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	ASME Section XI, Subsection IWF Program	III.B1.2-2 (T-28)	3.5.1-54	A
Supports (sliding surfaces for Class 2 and 3 piping and components such as component cooling heat exchangers)	Structural support	Lubrite or graphitic tool steel	Air indoor	Loss of mechanical function/ corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	ASME Section XI, Subsection IWF Program	III.B1.2-3 (T-32)	3.5.1-56	A
Support (members, connections, and anchorage to building structure for Class 2/ 3 vessels, exchangers, pumps, valves, piping and miscellaneous equipment items)	Structural support	Stainless steel	Air indoor	None	None	III.B1.2-7 (TP-05)	3.5.1-59	A

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for Class 2/ 3 vessels, exchangers, pumps, valves, piping and miscellaneous equipment items)	Structural support	Stainless steel	Air with borated water leakage	None	None	III.B1.2-8 (TP-04)	3.5.1-59	A
Support (members, connections, and anchorage to building structure for Class 2/ 3 valves, piping and miscellaneous equipment items in condensate storage tank areas)	Structural support	Steel	Air outdoor	Loss of material/ general corrosion	ASME Section XI, Subsection IWF Program	III.B1.2-10 (T-24)	3.5.1-53	A, 7, 31
Support (members, connections, and anchorage to building structure for Class 2/ 3 vessels, exchangers, pumps, valves, piping and miscellaneous equipment items)	Structural support	Steel	Air indoor	Loss of material/ general corrosion	ASME Section XI, Subsection IWF Program	III.B1.2-10 (T-24)	3.5.1-53	A, 7, 31

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for Class 2/ 3 vessels, exchangers, pumps, valves, piping and miscellaneous equipment items)	Structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B1.2-11 (T-25)	3.5.1-55	A, 31
Support (vibration isolation elements for Class 2/ 3 vessels, exchangers, pumps, valves, piping and miscellaneous equipment items)	Structural support	Elastomers	Air indoor	Reduction or loss of isolation function/ radiation hardening, temperature, humidity, sustained vibratory loading	ASME Section XI, Subsection IWF Program	III.B1.2-12 (T-33)	3.5.1-57	A

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (building concrete at locations of expansion and grouted anchors, grout pads for support base plates, and embedded support plates/ structural shapes for cable tray, conduit, tubing tray, tubing, non-ASME valves, piping and miscellaneous equipment items)	Structural support	Reinforced concrete, grout	Air outdoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	III.B2-1 (T-29)	3.5.1-40	A

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (building concrete at locations of expansion and grouted anchors, grout pads for support base plates, and embedded support plates/ structural shapes for cable tray, conduit, tubing tray, tubing, non-ASME vessels, exchangers, pumps, valves, piping, and miscellaneous equipment items)	Structural support	Reinforced concrete, grout	Air indoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	III.B2-1 (T-29)	3.5.1-40	A
Supports (sliding support bearings and sliding support surfaces for non-ASME piping and components)	Structural support	Lubrite or graphitic tool steel	Air indoor	Loss of mechanical function/ corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	Structures Monitoring Program	III.B2-2 (TP-01)	3.5.1-52	A
Cable tray, conduit, wireway, and tube tray	Shelter protection, structural support	Aluminum	Air indoor	None	None	III.B2-4 (TP-08)	3.5.1-58	C

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Cable tray, conduit, wireway, and tube tray	Shelter protection, structural support	Aluminum	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B2-6 (TP-03)	3.5.1-55	C
Insulation jacket at penetrations for hot piping at the Reactor Containment Vessels and Shield Buildings	Thermal insulation	Aluminum	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B2-6 (TP-03)	3.5.1-55	C
Insulation jacket on high energy piping in areas subject to HELB	Thermal insulation	Aluminum	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B2-6 (TP-03)	3.5.1-55	C
Insulation jacket on the RHR to SI pumps within the SI Room and on the SI pump suction lines within the SI Room	Thermal insulation	Aluminum	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B2-6 (TP-03)	3.5.1-55	C

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Insulation on the RHR to SI valves MV-32206 and MV-32207 [MV-32208 and MV-32209], and insulation on RH lines within the RH pit and on the lines between the containment spray pump rooms and RHR pits	Thermal insulation	Aluminum	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B2-6 (TP-03)	3.5.1-55	C
Cable tray, conduit, wireway, and tube tray	Shelter protection, structural support	Stainless steel	Air indoor	None	None	III.B2-8 (TP-05)	3.5.1-59	C
Support (members, connections, and anchorage to building structure for cable tray, conduit, tubing tray, tubing, non-ASME vessels, exchangers, pumps, valves, piping and miscellaneous equipment items)	Structural support	Stainless steel	Air indoor	None	None	III.B2-8 (TP-05)	3.5.1-59	A

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Cable tray, conduit, wireway, and tube tray	Shelter protection, structural support	Stainless steel	Air with borated water leakage	None	None	III.B2-9 (TP-04)	3.5.1-59	C
Support (members, connections, and anchorage to building structure for cable tray, conduit, tubing tray, tubing, non-ASME vessels, exchangers, pumps, valves, piping and miscellaneous equipment items)	Structural support	Stainless steel	Air with borated water leakage	None	None	III.B2-9 (TP-04)	3.5.1-59	A
Cable tray, conduit, wireway, and tube tray	Shelter protection, structural support	Steel	Air indoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B2-10 (T-30)	3.5.1-39	C, 7
Cable tray, conduit, wireway, and tube tray	Shelter protection, structural support	Steel	Air outdoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B2-10 (T-30)	3.5.1-39	C, 7

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, cable clamps, connections, and anchorage to building structure for cable tray, conduit, cable, tubing tray, tubing, non-ASME valves, piping and miscellaneous equipment items)	Structural support	Steel	Air outdoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B2-10 (T-30)	3.5.1-39	A, 7, 31
Support (members, cable clamps, connections, and anchorage to building structure for cable tray, conduit, cable, tubing tray, tubing, non-ASME vessels, exchangers, pumps, valves, piping and miscellaneous equipment items)	Structural support	Steel	Air indoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B2-10 (T-30)	3.5.1-39	A, 7, 31
Cable tray, conduit, wireway, and tube tray	Shelter protection, structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B2-11 (T-25)	3.5.1-55	C

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, cable clamps, connections, and anchorage to building structure for cable tray, conduit, cable, tubing tray, tubing, non-ASME vessels, exchangers, pumps, valves, piping and miscellaneous equipment items)	Structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B2-11 (T-25)	3.5.1-55	A, 31

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (building concrete at locations of expansion and grouted anchors, grout pads for support base plates, and embedded support plates/ structural shapes for cabinets, panels, racks, equipment enclosures, junction boxes, bus ducts, breakers, transformers, instruments, and related items)	Structural support	Reinforced concrete, grout	Air indoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	III.B3-1 (T-29)	3.5.1-40	A

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (building concrete at locations of expansion and grouted anchors, grout pads for support base plates, and embedded support plates/ structural shapes for cabinets, panels, racks, equipment enclosures, junction boxes, bus ducts, breakers, transformers, instruments, and related items)	Structural support	Reinforced concrete, grout	Air outdoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	III.B3-1 (T-29)	3.5.1-40	A
Cabinets, panels, racks, equipment enclosures, junction boxes, breaker housings, transformer housings, lighting fixtures, and miscellaneous equipment/ instrumentation enclosures	Shelter protection, structural support	Aluminum	Air indoor	None	None	III.B3-2 (TP-08)	3.5.1-58	C

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Cabinets, panels, racks, equipment enclosures, junction boxes, breaker housings, transformer housings, lighting fixtures, and miscellaneous equipment/ instrumentation enclosures	Shelter protection, structural support	Aluminum	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B3-4 (TP-03)	3.5.1-55	C
Cabinets, panels, racks, equipment enclosures, junction boxes, breaker housings, transformer housings, lighting fixtures, and miscellaneous equipment/ instrumentation enclosures	Shelter protection, structural support	Stainless steel	Air indoor	None	None	III.B3-5 (TP-05)	3.5.1-59	C

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for cabinets, panels, racks, equipment enclosures, junction boxes, bus ducts, breakers, transformers, instruments, and related items)	Structural support	Stainless steel	Air indoor	None	None	III.B3-5 (TP-05)	3.5.1-59	A
Cabinets, panels, racks, equipment enclosures, junction boxes, breaker housings, transformer housings, lighting fixtures, and miscellaneous equipment/ instrumentation enclosures	Shelter protection, structural support	Stainless steel	Air with borated water leakage	None	None	III.B3-6 (TP-04)	3.5.1-59	C

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for cabinets, panels, racks, equipment enclosures, junction boxes, bus ducts, breakers, transformers, instruments, and related items)	Structural support	Stainless steel	Air with borated water leakage	None	None	III.B3-6 (TP-04)	3.5.1-59	A
Cabinets, panels, racks, equipment enclosures, junction boxes, breaker housings, transformer housings, lighting fixtures, and miscellaneous equipment/ instrumentation enclosures	Shelter protection, structural support	Steel	Air indoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B3-7 (T-30)	3.5.1-39	C, 7

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Cabinets, panels, racks, equipment enclosures, junction boxes, breaker housings, transformer housings, lighting fixtures, and miscellaneous equipment/ instrumentation enclosures	Shelter protection, structural support	Steel	Air outdoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B3-7 (T-30)	3.5.1-39	C, 7
Support (members, connections, and anchorage to building structure for cabinets, panels, racks, equipment enclosures, junction boxes, bus ducts, breakers, transformers, instruments, and related items)	Structural support	Steel	Air indoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B3-7 (T-30)	3.5.1-39	A, 7, 31

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for cabinets, panels, racks, equipment enclosures, junction boxes, bus ducts, breakers, transformers, instruments, and related items)	Structural support	Steel	Air outdoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B3-7 (T-30)	3.5.1-39	A, 7, 31
Cabinets, panels, racks, equipment enclosures, junction boxes, breaker housings, transformer housings, lighting fixtures, and miscellaneous equipment/ instrumentation enclosures	Shelter protection, structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B3-8 (T-25)	3.5.1-55	C

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for cabinets, panels, racks, equipment enclosures, junction boxes, bus ducts, breakers, transformers, instruments, and related items)	Structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B3-8 (T-25)	3.5.1-55	A, 31
Support (building concrete at locations of expansion and grouted anchors, grout pads for support base plates, and embedded support plates/ structural shapes for diesel equipment, HVAC fan/ louver/ damper housings, HVAC ducts, and miscellaneous mechanical equipment)	Structural support	Reinforced concrete, grout	Air indoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	III.B4-1 (T-29)	3.5.1-40	A

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (building concrete at locations of expansion and grouted anchors, grout pads for support base plates, and embedded support plates/ structural shapes for diesel equipment, HVAC louver/ damper housings, HVAC ducts, and miscellaneous mechanical equipment)	Structural support	Reinforced concrete, grout	Air outdoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	III.B4-1 (T-29)	3.5.1-40	A
Supports (sliding support bearings and sliding support surfaces for D5/D6 exhaust silencer and other miscellaneous mechanical equipment)	Structural support	Lubrite or graphitic tool steel	Air indoor	Loss of mechanical function/ corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	Structures Monitoring Program	III.B4-2 (TP-01)	3.5.1-52	A
HVAC fan/ louver/ damper housings and miscellaneous mechanical equipment enclosures	Shelter protection, structural support	Aluminum	Air indoor	None	None	III.B4-4 (TP-08)	3.5.1-58	C

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
HVAC fan/ louver/ damper housings and miscellaneous mechanical equipment enclosures	Shelter protection, structural support	Aluminum	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B4-6 (TP-03)	3.5.1-55	C
HVAC fan/ louver/ damper housings and miscellaneous mechanical equipment enclosures	Shelter protection, structural support	Stainless steel	Air indoor	None	None	III.B4-8 (TP-05)	3.5.1-59	C
Support (members, connections, and anchorage to building structure for diesel equipment, HVAC fan/ louver/ damper housings, HVAC ducts, and miscellaneous mechanical equipment)	Structural support	Stainless steel	Air indoor	None	None	III.B4-8 (TP-05)	3.5.1-59	A
HVAC fan/ louver/ damper housings and miscellaneous mechanical equipment enclosures	Shelter protection, structural support	Stainless steel	Air with borated water leakage	None	None	III.B4-9 (TP-04)	3.5.1-59	C

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for diesel equipment, HVAC fan/ louver/ damper housings, HVAC ducts, and miscellaneous mechanical equipment)	Structural support	Stainless steel	Air with borated water leakage	None	None	III.B4-9 (TP-04)	3.5.1-59	A
HVAC fan/ louver/ damper housings and miscellaneous mechanical equipment enclosures	Shelter protection, structural support	Steel	Air indoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B4-10 (T-30)	3.5.1-39	C, 7
HVAC fan/ louver/ damper housings and miscellaneous mechanical equipment enclosures	Shelter protection, structural support	Steel	Air outdoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B4-10 (T-30)	3.5.1-39	C, 7

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for diesel equipment, HVAC fan/ louver/ damper housings, HVAC ducts, and miscellaneous mechanical equipment)	Structural support	Steel	Air indoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B4-10 (T-30)	3.5.1-39	A, 7, 31
Support (members, connections, and anchorage to building structure for diesel equipment, HVAC louver/ damper housings, HVAC ducts, and miscellaneous mechanical equipment)	Structural support	Steel	Air outdoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B4-10 (T-30)	3.5.1-39	A, 7, 31
HVAC fan/ louver/ damper housings and miscellaneous mechanical equipment enclosures	Shelter protection, structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B4-11 (T-25)	3.5.1-55	C

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for diesel equipment, HVAC fan/ louver/ damper housings, HVAC ducts, and miscellaneous mechanical equipment)	Structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B4-11 (T-25)	3.5.1-55	A, 31
Support (vibration isolation elements for diesel equipment, HVAC fan housings and miscellaneous mechanical equipment)	Structural support	Elastomers	Air indoor	Reduction or loss of isolation function/ radiation hardening, temperature, humidity, sustained vibratory loading	Structures Monitoring Program	III.B4-12 (T-31)	3.5.1-41	A
Metal enclosed bus (enclosure assemblies)	Shelter protection	Elastomers	Air indoor	Hardening and loss of strength/ elastomer degradation	Structures Monitoring Program	VI.A-12 (LP-10)	3.6.1-10	A
Metal enclosed bus (enclosure assemblies)	Shelter protection	Elastomers	Air outdoor	Hardening and loss of strength/ elastomer degradation	Structures Monitoring Program	VI.A-12 (LP-10)	3.6.1-10	A
Metal enclosed bus (enclosure assemblies)	Shelter protection, structural support	Steel	Air indoor	Loss of material/ general corrosion	Structures Monitoring Program	VI.A-13 (LP-06)	3.6.1-09	A

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Metal enclosed bus (enclosure assemblies)	Shelter protection, structural support	Steel	Air outdoor	Loss of material/ general corrosion	Structures Monitoring Program	VI.A-13 (LP-06)	3.6.1-09	A
Cabinets, panels, racks, equipment enclosures, junction boxes, breaker housings, transformer housings, lighting fixtures, and miscellaneous equipment/ instrumentation enclosures	Shelter protection, structural support	Aluminum, stainless steel	Air outdoor	None	None			J, 14
Cable tray, conduit, wireway, and tube tray	Shelter protection, structural support	Aluminum, stainless steel	Air outdoor	None	None			J, 14
Insulation at penetrations for hot piping at the old service building (D1/D2 diesel exhaust pipes), and D5/D6 diesel generator building (diesel exhaust pipes)	Thermal insulation	Fiberglass, calcium silicate	Air indoor	None	None			J, 32

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Insulation at penetrations for hot piping at the Reactor Containment Vessels and Shield Buildings	Thermal insulation	Fiberglass, calcium silicate	Air with borated water leakage	None	None			J, 32
Insulation jacket at penetrations for hot piping at the Old Service Building (D1/D2 diesel exhaust pipes), and D5/D6 Diesel Generator Building (diesel exhaust pipes)	Thermal insulation	Aluminum	Air indoor	None	None			J, 32
Insulation jacket at penetrations for hot piping at the Old Service Building (D1/D2 diesel exhaust pipes), and D5/D6 Diesel Generator Building (diesel exhaust pipes)	Thermal insulation	Stainless steel	Air indoor	None	None			J, 32

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Insulation jacket at penetrations for hot piping at the Reactor Containment Vessels and Shield Buildings	Thermal insulation	Stainless steel	Air with borated water leakage	None	None			J, 32
Insulation jacket on high energy piping in areas subject to HELB	Thermal insulation	Aluminum	Air indoor	None	None			J, 32
Insulation jacket on high energy piping in areas subject to HELB	Thermal insulation	Stainless steel	Air indoor	None	None			J, 32
Insulation jacket on high energy piping in areas subject to HELB	Thermal insulation	Stainless steel	Air with borated water leakage	None	None			J, 32
Insulation jacket on structures and components within the Reactor Containment Vessels	Thermal insulation	Stainless steel	Air with borated water leakage	None	None			J, 32
Insulation jacket on the AF turbine pump casing, pump steam supply, and pump steam exhaust	Thermal insulation	Aluminum	Air indoor	None	None			J, 32

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Insulation jacket on the AF turbine pump casing, pump steam supply, and pump steam exhaust	Thermal insulation	Stainless steel	Air indoor	None	None			J, 32
Insulation jacket on the RHR to SI pumps within the SI Room and on the SI pump suction lines within the SI Room	Thermal insulation	Stainless steel	Air with borated water leakage	None	None			J, 32
Insulation on D1/D2 sensing line enclosure box, D1/D2 diesel exhaust pipes, D5/D6 diesel exhaust pipes, and D1/D2 governor cable	Thermal insulation	Fiberglass, calcium silicate	Air indoor	None	None			J, 32
Insulation on high energy piping in areas subject to HELB	Thermal insulation	Reflective metallic insulation, fiberglass, calcium silicate	Air indoor	None	None			J, 32
Insulation on high energy piping in areas subject to HELB	Thermal insulation	Reflective metallic insulation, fiberglass, calcium silicate	Air with borated water leakage	None	None			J, 32

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Insulation on RH lines within the RH pit and on the lines between the containment spray pump rooms and RHR pits	Thermal insulation	Calcium silicate	Air with borated water leakage	None	None			J, 32
Insulation on structures and components within the Reactor Containment Vessels	Thermal insulation	Reflective metallic insulation, fiberglass, calcium silicate	Air with borated water leakage	None	None			J, 32
Insulation on the AF turbine pump casing, pump steam supply, and pump steam exhaust	Thermal insulation	Calcium silicate	Air indoor	None	None			J, 32
Insulation on the Relay Room north wall of the Auxiliary Building	Thermal insulation	Fiberglass	Air indoor	None	None			J, 32

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Insulation on the RHR suction lines between MV-32164 to MV-32165 [MV-32192 to MV-32193] and MV-32230 to MV-32231 [MV-32232 to MV-32233] in containment	Thermal insulation	Reflective metallic insulation	Air with borated water leakage	None	None			J, 32
Insulation on the RHR to SI pumps within the SI Room and on the SI pump suction lines within the SI Room	Thermal insulation	Calcium silicate	Air with borated water leakage	None	None			J, 32
Insulation on the RHR to SI valves MV-32206 and MV-32207 [MV-32208 and MV-32209]	Thermal insulation	Fiberglass	Air with borated water leakage	None	None			J, 32

Table 3.5.2-2 Structures and Component Supports - Component Supports - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Insulation on the RHR to SI valves MV-32206 and MV-32207 [MV-32208 and MV-32209], and insulation on RH lines within the RH pit and on the lines between the containment spray pump rooms and RHR pits	Thermal insulation	Stainless steel	Air with borated water leakage	None	None			J, 32
Insulation on the Unit 1 seal water return line between MV-32199 and the containment shell	Thermal insulation	Reflective metallic insulation	Air with borated water leakage	None	None			J, 32
Support (submerged building concrete at locations of embedded support plates/ structural shapes for safeguards screens, safeguards bay gates and other Screenhouse SSC)	Structural support	Reinforced concrete	Groundwater/ soil (accessible)	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program			G, 5

Table 3.5.2-3 Structures and Component Supports - Cranes, Heavy Loads, Fuel Handling - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Cranes - structural girders (load carrying structural members, welded and bolted connections for heavy load handling systems and light load handling systems associated with refueling activities including the spent fuel pool bridge crane, special lifting devices, fuel transfer system conveyor cars, fuel transfer tipping devices, and manipulator cranes)	Structural support	Stainless steel	Treated borated water	Loss of material/ crevice corrosion	Water Chemistry Program	III.A5-13 (T-14)	3.5.1-46	D, 10
Cranes - structural girders (load carrying structural members, welded and bolted connections for heavy load handling systems and light load handling systems associated with refueling activities including the spent fuel pool bridge crane, special lifting devices, fuel transfer system conveyor cars, fuel transfer tipping devices, and manipulator cranes)	Structural support	Stainless steel	Air indoor	None	None	III.B5-5 (TP-05)	3.5.1-59	C

Table 3.5.2-3 Structures and Component Supports - Cranes, Heavy Loads, Fuel Handling - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Cranes - structural girders (load carrying structural members, welded and bolted connections for heavy load handling systems and light load handling systems associated with refueling activities including the spent fuel pool bridge crane, special lifting devices, fuel transfer system conveyor cars, fuel transfer tipping devices, and manipulator cranes)	Structural support	Stainless steel	Air with borated water leakage	None	None	III.B5-6 (TP-04)	3.5.1-59	C
Cranes - rails (rails and associated welded and bolted connections for heavy load handling systems and light load handling systems associated with refueling activities including the containment polar cranes, auxiliary building crane, spent fuel pool bridge crane, and manipulator cranes)	Structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B5-8 (T-25)	3.5.1-55	C, 31

Table 3.5.2-3 Structures and Component Supports - Cranes, Heavy Loads, Fuel Handling - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Cranes - structural girders (load carrying structural members, welded and bolted connections for heavy load handling systems and light load handling systems associated with refueling activities including the containment polar cranes, auxiliary building crane, spent fuel pool bridge crane, special lifting devices, and manipulator cranes)	Structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B5-8 (T-25)	3.5.1-55	C, 31
Cranes - rails (rails and associated welded and bolted connections for heavy load handling systems and light load handling systems associated with refueling activities including the containment polar cranes, turbine building cranes, auxiliary building crane, spent fuel pool bridge crane, crane above safeguard traveling screens, and manipulator cranes)	Structural support	Steel	Air indoor	Loss of material/ wear and general corrosion	Inspection of Overhead Heavy Load and LIght Load (Related to Refueling) Handling Systems Program	VII.B-1 (A-05)	3.3.1-74	A, 3, 31

Table 3.5.2-3 Structures and Component Supports - Cranes, Heavy Loads, Fuel Handling - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Cranes - structural girders	Structural support	Steel	Air indoor	Cumulative fatigue damage / fatigue	TLAA (Section 4.7.4)	VII.B-2 (A-06)	3.3.1-01	A
Cranes - structural girders (load carrying structural members, welded and bolted connections for heavy load handling systems and light load handling systems associated with refueling activities including the containment polar cranes, turbine building cranes, auxiliary building crane, spent fuel pool bridge crane, crane above safeguard traveling screens, special lifting devices, and manipulator cranes)	Structural support	Steel	Air indoor	Loss of material/ general corrosion	Inspection of Overhead Heavy Load and LIght Load (Related to Refueling) Handling Systems Program	VII.B-3 (A-07)	3.3.1-73	A, 31

Table 3.5.2-4 Structures and Component Supports - D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (embedded members)	Structural support	Steel	Embedded in concrete	None	None	II.A2-9 (C-09)	3.5.1-06	C
Concrete (D5/D6 diesel engine exhaust lines at concrete interface)	Structural support	Reinforced concrete	Air indoor	Reduction of strength and modulus/ elevated temperature	Structures Monitoring Program	III.A3-1 (T-10)	3.5.1-33	E
Concrete (beams, columns, curbs, equipment foundations, slabs, walls)	Direct flow, flood barrier, missile barrier, structural support	Reinforced concrete, unreinforced concrete	Air indoor	None	None	III.A3-1 (T-10)	3.5.1-33	E
Concrete (slabs, walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Cracking due to expansion/ reaction with aggregates	Structures Monitoring Program	III.A3-2 (T-03)	3.5.1-27	A
Concrete (beams, columns, curbs, equipment foundations, slabs, walls)	Direct flow, flood barrier, missile barrier, structural support	Reinforced concrete, unreinforced concrete	Air indoor	Cracking due to expansion/ reaction with aggregates	Structures Monitoring Program	III.A3-2 (T-03)	3.5.1-27	A
Concrete (foundations, walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	None	None	III.A3-2 (T-03)	3.5.1-27	A

Table 3.5.2-4 Structures and Component Supports - D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (slabs, walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A3-3 (T-08)	3.5.1-28	A, 1
Concrete (beams, columns, curbs, equipment foundations, slabs, walls)	Direct flow, flood barrier, missile barrier, structural support	Reinforced concrete, unreinforced concrete	Air indoor	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A3-3 (T-08)	3.5.1-28	A, 1
Concrete (foundations, walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A3-3 (T-08)	3.5.1-28	A, 1
Concrete (foundations, walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A3-4 (T-05)	3.5.1-31	A
Concrete (foundations, walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A3-5 (T-07)	3.5.1-31	A

Table 3.5.2-4 Structures and Component Supports - D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (slabs, walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Loss of material (spalling, scaling) and cracking/ freeze-thaw	Structures Monitoring Program	III.A3-6 (T-01)	3.5.1-26	A
Concrete (foundations, walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	Loss of material (spalling, scaling) and cracking/ freeze-thaw	Structures Monitoring Program	III.A3-6 (T-01)	3.5.1-26	A
Concrete (slabs, walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide	Structures Monitoring Program	III.A3-7 (T-02)	3.5.1-32	A
Concrete (foundations, walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	None	None	III.A3-7 (T-02)	3.5.1-32	A
Concrete (foundations, subfoundations)	Flood barrier, shelter protection, structural support	Reinforced concrete, porous concrete	Groundwater/ soil	None	None	III.A3-8 (T-09)	3.5.1-29	A

Table 3.5.2-4 Structures and Component Supports - D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (slabs, walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A3-9 (T-04)	3.5.1-23	A
Concrete (beams, columns, curbs, equipment foundations, slabs, walls)	Direct flow, flood barrier, missile barrier, structural support	Reinforced concrete, unreinforced concrete	Air indoor	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A3-9 (T-04)	3.5.1-23	A
Concrete (slabs, walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A3-10 (T-06)	3.5.1-24	A
Concrete (beams, columns, curbs, equipment foundations, slabs, walls)	Direct flow, flood barrier, missile barrier, structural support	Reinforced concrete, unreinforced concrete	Air indoor	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A3-10 (T-06)	3.5.1-24	A
Masonry walls (old service bldg)	Fire barrier, structural support	Concrete block	Air indoor	Cracking/ restraint, shrinkage, creep, and aggressive environment	Fire Protection Program	III.A3-11 (T-12)	3.5.1-43	E
Masonry walls (old service bldg)	Fire barrier, structural support	Concrete block	Air indoor	Cracking/ restraint, shrinkage, creep, and aggressive environment	Masonry Wall Program	III.A3-11 (T-12)	3.5.1-43	A

Table 3.5.2-4 Structures and Component Supports - D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (structural steel members, connections, and anchorage for main load carrying structural steel frame, embedded steel, pipe sleeves, curbs, access hatches, miscellaneous items)	Direct flow, structural support	Steel	Air indoor	Loss of material/ corrosion	Structures Monitoring Program	III.A3-12 (T-11)	3.5.1-25	A, 31
Steel components (structural steel members, connections, and anchorage for access hatches, embedded steel, bulkheads doors/panels)	Flood barrier, structural support	Steel	Air outdoor	Loss of material/ corrosion	Structures Monitoring Program	III.A3-12 (T-11)	3.5.1-25	A, 31
Elastomers (seismic gap seals)	Expansion/ separation, flood barrier	Elastomers	Air indoor	Loss of sealing/ deterioration of seals, gaskets, and moisture barriers	Structures Monitoring Program	III.A6-12 (TP-07)	3.5.1-44	C
Elastomers (seismic gap seals, flood door/ panel/ penetration seals)	Expansion/ separation, flood barrier, shelter protection	Elastomers	Air outdoor	Loss of sealing/ deterioration of seals, gaskets, and moisture barriers	Structures Monitoring Program	III.A6-12 (TP-07)	3.5.1-44	C

Table 3.5.2-4 Structures and Component Supports - D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (building concrete at locations of expansion and grouted anchors; grout pads for support base plates)	Structural support	Reinforced concrete, grout	Air indoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	III.B5-1 (T-29)	3.5.1-40	A
Support (members, connections, and anchorage to building structure for platforms, stairs, ladders)	Structural support	Steel	Air indoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B5-7 (T-30)	3.5.1-39	A, 7, 31
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air indoor	Concrete cracking and spalling/ aggressive chemical attack, and reaction with aggregates	Fire Protection Program	VII.G-28 (A-90)	3.3.1-65	B
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air indoor	Concrete cracking and spalling/ aggressive chemical attack, and reaction with aggregates	Structures Monitoring Program	VII.G-28 (A-90)	3.3.1-65	A
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air indoor	Loss of material/ corrosion of embedded steel	Fire Protection Program	VII.G-29 (A-91)	3.3.1-67	B

Table 3.5.2-4 Structures and Component Supports - D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air indoor	Loss of material/ corrosion of embedded steel	Structures Monitoring Program	VII.G-29 (A-91)	3.3.1-67	A
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air outdoor	Concrete cracking and spalling/ freeze-thaw, aggressive chemical attack, and reaction with aggregates	Fire Protection Program	VII.G-30 (A-92)	3.3.1-66	B
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air outdoor	Concrete cracking and spalling/ freeze-thaw, aggressive chemical attack, and reaction with aggregates	Structures Monitoring Program	VII.G-30 (A-92)	3.3.1-66	A
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air outdoor	Loss of material/ corrosion of embedded steel	Fire Protection Program	VII.G-31 (A-93)	3.3.1-67	B
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air outdoor	Loss of material/ corrosion of embedded steel	Structures Monitoring Program	VII.G-31 (A-93)	3.3.1-67	A
Aluminum (seismic gap covers at NSB and DGB)	Expansion/ separation	Aluminum	Air outdoor	Loss of material/ galvanic corrosion	Structures Monitoring Program			H, 18

Table 3.5.2-4 Structures and Component Supports - D5/D6 Diesel Generator Building and Underground Storage Vault, Fuel Oil Transfer House, Old Service Building, and New Service Building - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (fuel oil storage vault roof slab)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Cracking and spalling/ fatigue due to low level repeated load	Structures Monitoring Program			J, 19
Roofing (diesel generator bldg.)	Shelter protection	Built-up roofing composite	Air outdoor	Separation, environmental degradation, water in-leakage/ weathering	Structures Monitoring Program			J, 6

Table 3.5.2-5 Structures and Component Supports - Fire Protection Barriers - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (fire barrier penetration sleeves)	Fire barrier, structural support	Steel	Embedded in concrete	None	None	II.A2-9 (C-09)	3.5.1-06	C
Steel components (hydrant house enclosures and miscellaneous members, connections and anchorage)	Shelter protection, structural support	Steel	Air outdoor	Loss of material/ corrosion	Structures Monitoring Program	III.A3-12 (T-11)	3.5.1-25	A, 31
Stainless steel components (framing, banding, wire, sheeting, and miscellaneous stainless steel connecting components used to secure non-metallic fireproofing in place)	Fire barrier, structural support	Stainless steel	Air indoor	None	None	III.B5-5 (TP-05)	3.5.1-59	C
Fire barrier gaskets (rubber used under containment angles to prevent fuel oil from spreading to other areas)	Fire barrier	Elastomers	Air indoor	Increased hardness, shrinkage and loss of strength/ weathering	Fire Protection Program	VII.G-1 (A-19)	3.3.1-61	D

Table 3.5.2-5 Structures and Component Supports - Fire Protection Barriers - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Fire barrier penetration seals (silicone foam and silicone elastomers used in penetrations between adjacent fire areas to close gaps for cable trays, conduits, HVAC ducts, instrumentation, piping)	Fire barrier, flood barrier	Elastomers	Air indoor	Increased hardness, shrinkage and loss of strength/ weathering	Fire Protection Program	VII.G-1 (A-19)	3.3.1-61	B
Fire rated doors (doors, hatches, turbine building smoke hatches and associated frames)	Fire barrier, flood barrier, gaseous release path, HELB shielding	Steel	Air indoor	Loss of material/ corrosion, holes, missing parts; change in door clearance/ wear, damage, connection slippage, warping	Fire Protection Program	VII.G-3 (A-21)	3.3.1-63	B, 3
Fire rated doors (hardware for doors, hatches, and turbine building smoke hatches)	Fire barrier, flood barrier, gaseous release path, HELB shielding	Steel	Air indoor	Loss of material/ wear, corrosion, missing parts	Fire Protection Program	VII.G-3 (A-21)	3.3.1-63	B, 3

Table 3.5.2-5 Structures and Component Supports - Fire Protection Barriers - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (framing, sleeves, banding, wire, sheeting, and miscellaneous steel connecting components used to secure non-metallic fireproofing in place; fire damper housings; angle used to contain fuel oil leaks)	Fire barrier, structural support	Steel	Air indoor	Loss of material/ general corrosion	Fire Protection Program	VII.G-3 (A-21)	3.3.1-63	D, 3
Fire rated doors (doors, hatches, turbine building smoke hatches and associated frames)	Fire barrier, flood barrier, gaseous release path, HELB shielding, shelter protection	Steel	Air outdoor	Loss of material/ corrosion, holes, missing parts; change in door clearance/ wear, damage, connection slippage, warping	Fire Protection Program	VII.G-4 (A-22)	3.3.1-63	B, 3
Fire rated doors (hardware for doors, hatches, and turbine building smoke hatches)	Fire barrier, flood barrier, gaseous release path, HELB shielding, shelter protection	Steel	Air outdoor	Loss of material/ wear, corrosion, missing parts	Fire Protection Program	VII.G-4 (A-22)	3.3.1-63	B, 3

Table 3.5.2-5 Structures and Component Supports - Fire Protection Barriers - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Fire barrier penetration seals (concrete and grout used in penetrations between adjacent fire areas to close gaps for conduits and piping)	Fire barrier, flood barrier	Unreinforced concrete, grout	Air indoor	Concrete cracking and spalling/ aggressive chemical attack, and reaction with aggregates	Fire Protection Program	VII.G-28 (A-90)	3.3.1-65	B
Concrete (at hydrant house foundation)	Structural support	Reinforced concrete	Air outdoor	Concrete cracking and spalling/ freeze-thaw, aggressive chemical attack, and reaction with aggregates	Structures Monitoring Program	VII.G-30 (A-92)	3.3.1-66	A, 20
Fire barrier penetration seals (concrete and grout used in penetrations between adjacent fire areas to close gaps for conduits and piping)	Fire barrier, flood barrier	Unreinforced concrete, grout	Air outdoor	Concrete cracking and spalling/ freeze-thaw, aggressive chemical attack, and reaction with aggregates	Fire Protection Program	VII.G-30 (A-92)	3.3.1-66	B
Concrete (at hydrant house foundation)	Structural support	Reinforced concrete	Air outdoor	Loss of material/ corrosion of embedded steel	Structures Monitoring Program	VII.G-31 (A-93)	3.3.1-67	A, 20

Table 3.5.2-5 Structures and Component Supports - Fire Protection Barriers - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Fire barrier penetration seals (cementitious fireproofing, mineral fiber, and fibrous material used in penetrations between adjacent fire areas to close gaps around cable and cable tray, conduit, HVAC ducts, instrumentation, piping)	Fire barrier	Cementitious fireproofing and fire rated caulks and putties with smooth hard surface, rigid non-shrink mineral fiber board, fibrous fire rated material	Air indoor	Loss of material/ abrasion; cracking/ vibration and movement; separation/ vibration and movement	Fire Protection Program			J
Fireproofing (cementitious fireproofing, mineral fiber, and fibrous material used as a fire wrap or partition within a fire area to meet separation requirements or provide a fire rating for cable and cable tray, conduit, HVAC ducts, instrumentation, piping, metal deck, structural steel)	Fire barrier	Cementitious fireproofing and fire rated caulks and putties with smooth hard surface, rigid non-shrink mineral fiber board, fibrous fire rated material	Air indoor	Loss of material/ abrasion; cracking/ vibration	Fire Protection Program			J

Table 3.5.2-5 Structures and Component Supports - Fire Protection Barriers - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Fireproofing (cementitious fireproofing, mineral fiber, and fibrous material used as a fire wrap or partition within a fire area to meet separation requirements or provide a fire rating for cable and cable tray, conduit, HVAC ducts, instrumentation, piping, metal deck, structural steel)	Fire barrier	Cementitious fireproofing with rough surface (sprayed on or troweled)	Air indoor	Loss of material/ flaking, abrasion; cracking/ vibration	Fire Protection Program			J

Table 3.5.2-6 Structures and Component Supports - Radwaste Building, Old Administration Building, and Administration Building Addition - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (beams, columns, slabs, walls)	Structural support	Reinforced concrete	Air indoor	None	None	III.A3-1 (T-10)	3.5.1-33	E
Concrete (beams, columns, slabs, walls)	Structural support	Reinforced concrete	Air indoor	Cracking due to expansion/ reaction with aggregates	Structures Monitoring Program	III.A3-2 (T-03)	3.5.1-27	A
Concrete (foundations, piers, walls)	Structural support	Reinforced concrete	Groundwater/ soil	None	None	III.A3-2 (T-03)	3.5.1-27	A
Concrete (slabs, walls)	Structural support	Reinforced concrete	Air outdoor	Cracking due to expansion/ reaction with aggregates	Structures Monitoring Program	III.A3-2 (T-03)	3.5.1-27	A
Concrete (beams, columns, slabs, walls)	Structural support	Reinforced concrete	Air indoor	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A3-3 (T-08)	3.5.1-28	A, 1
Concrete (foundations, piers, walls)	Structural support	Reinforced concrete	Groundwater/ soil	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A3-3 (T-08)	3.5.1-28	A, 1
Concrete (slabs, walls)	Structural support	Reinforced concrete	Air outdoor	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A3-3 (T-08)	3.5.1-28	A, 1
Concrete (foundations, piers, walls)	Structural support	Reinforced concrete	Groundwater/ soil	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A3-4 (T-05)	3.5.1-31	A

Table 3.5.2-6 Structures and Component Supports - Radwaste Building, Old Administration Building, and Administration Building Addition - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (foundations, piers, walls)	Structural support	Reinforced concrete	Groundwater/ soil	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A3-5 (T-07)	3.5.1-31	A
Concrete (foundations, piers, walls)	Structural support	Reinforced concrete	Groundwater/ soil	Loss of material (spalling, scaling) and cracking/ freeze-thaw	Structures Monitoring Program	III.A3-6 (T-01)	3.5.1-26	A
Concrete (slabs, walls)	Structural support	Reinforced concrete	Air outdoor	Loss of material (spalling, scaling) and cracking/ freeze-thaw	Structures Monitoring Program	III.A3-6 (T-01)	3.5.1-26	A
Concrete (foundations, piers, walls)	Structural support	Reinforced concrete	Groundwater/ soil	None	None	III.A3-7 (T-02)	3.5.1-32	A
Concrete (slabs, walls)	Structural support	Reinforced concrete	Air outdoor	Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide	Structures Monitoring Program	III.A3-7 (T-02)	3.5.1-32	A
Concrete (foundations, piers, subfoundations)	Structural support	Reinforced concrete, porous concrete	Groundwater/ soil	None	None	III.A3-8 (T-09)	3.5.1-29	A
Concrete (beams, columns, slabs, walls)	Structural support	Reinforced concrete	Air indoor	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A3-9 (T-04)	3.5.1-23	A

Table 3.5.2-6 Structures and Component Supports - Radwaste Building, Old Administration Building, and Administration Building Addition - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (slabs, walls)	Structural support	Reinforced concrete	Air outdoor	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A3-9 (T-04)	3.5.1-23	A
Concrete (beams, columns, slabs, walls)	Structural support	Reinforced concrete	Air indoor	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A3-10 (T-06)	3.5.1-24	A
Concrete (slabs, walls)	Structural support	Reinforced concrete	Air outdoor	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A3-10 (T-06)	3.5.1-24	A
Steel components (structural steel members, connections, and anchorage for main load carrying structural steel frame)	Structural support	Steel	Air indoor	Loss of material/ corrosion	Structures Monitoring Program	III.A3-12 (T-11)	3.5.1-25	A, 31
Elastomers (seismic gap seals at Radwaste Building to Auxiliary Building interface)	Expansion/ separation	Elastomers	Air outdoor	Loss of sealing/ deterioration of seals, gaskets, and moisture barriers	Structures Monitoring Program	III.A6-12 (TP-07)	3.5.1-44	C

Table 3.5.2-6 Structures and Component Supports - Radwaste Building, Old Administration Building, and Administration Building Addition - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (structural steel members, connections, and anchorage for main load carrying structural steel frame for Radwaste Building)	Structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B5-8 (T-25)	3.5.1-55	C, 31
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air indoor	Concrete cracking and spalling/ aggressive chemical attack, and reaction with aggregates	Fire Protection Program	VII.G-28 (A-90)	3.3.1-65	B
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air indoor	Concrete cracking and spalling/ aggressive chemical attack, and reaction with aggregates	Structures Monitoring Program	VII.G-28 (A-90)	3.3.1-65	A
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air indoor	Loss of material/ corrosion of embedded steel	Fire Protection Program	VII.G-29 (A-91)	3.3.1-67	B
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air indoor	Loss of material/ corrosion of embedded steel	Structures Monitoring Program	VII.G-29 (A-91)	3.3.1-67	A
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air outdoor	Concrete cracking and spalling/ freeze-thaw, aggressive chemical attack, and reaction with aggregates	Fire Protection Program	VII.G-30 (A-92)	3.3.1-66	B

Table 3.5.2-6 Structures and Component Supports - Radwaste Building, Old Administration Building, and Administration Building Addition - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air outdoor	Concrete cracking and spalling/ freeze-thaw, aggressive chemical attack, and reaction with aggregates	Structures Monitoring Program	VII.G-30 (A-92)	3.3.1-66	A
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air outdoor	Loss of material/ corrosion of embedded steel	Fire Protection Program	VII.G-31 (A-93)	3.3.1-67	B
Concrete (slabs, walls)	Fire barrier	Reinforced concrete	Air outdoor	Loss of material/ corrosion of embedded steel	Structures Monitoring Program	VII.G-31 (A-93)	3.3.1-67	A

Table 3.5.2-7 Structures and Component Supports - Reactor Containment Vessels Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (pressure vessel, penetration sleeves, embedded members)	Fire barrier	Steel	Air indoor	Loss of material/ general corrosion	Fire Protection Program	II.A2-9 (C-09)	3.5.1-06	E, 8
Steel components (pressure vessel, penetration sleeves, embedded members)	Structural pressure barrier, structural support	Steel	Air indoor	Loss of material/ general corrosion	10 CFR Part 50, Appendix J Program	II.A2-9 (C-09)	3.5.1-06	A, 8
Steel components (pressure vessel, penetration sleeves, embedded members)	Structural pressure barrier, structural support	Steel	Air indoor	Loss of material/ general corrosion	ASME Section XI, Subsection IWE Program	II.A2-9 (C-09)	3.5.1-06	A, 8
Steel components (pressure vessel, penetration sleeves, embedded members)	Structural pressure barrier, structural support	Steel	Embedded in concrete	None	None	II.A2-9 (C-09)	3.5.1-06	A, 22
Penetration sleeves	Fire barrier	Steel; dissimilar metal welds	Air indoor	Loss of material/ general corrosion	Fire Protection Program	II.A3-1 (C-12)	3.5.1-18	E, 8
Penetration sleeves	Structural pressure barrier, structural support	Steel; dissimilar metal welds	Air indoor	Loss of material/ general corrosion	10 CFR Part 50, Appendix J Program	II.A3-1 (C-12)	3.5.1-18	A, 25, 8

Table 3.5.2-7 Structures and Component Supports - Reactor Containment Vessels Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Penetration sleeves	Structural pressure barrier, structural support	Steel; dissimilar metal welds	Air indoor	Loss of material/ general corrosion	ASME Section XI, Subsection IWE Program	II.A3-1 (C-12)	3.5.1-18	A, 25, 8
Penetration sleeves; penetration bellows	Fire barrier	Stainless steel; dissimilar metal welds	Air indoor	Cracking/ stress corrosion cracking	Fire Protection Program	II.A3-2 (C-15)	3.5.1-10	E
Penetration sleeves; penetration bellows	Structural pressure barrier	Stainless steel; dissimilar metal welds	Air indoor	Cracking/ stress corrosion cracking	10 CFR Part 50, Appendix J Program	II.A3-2 (C-15)	3.5.1-10	A, 25
Penetration sleeves; penetration bellows	Structural pressure barrier	Stainless steel; dissimilar metal welds	Air indoor	Cracking/ stress corrosion cracking	ASME Section XI, Subsection IWE Program	II.A3-2 (C-15)	3.5.1-10	A, 25
Penetration sleeves, penetration bellows	Structural pressure barrier	Steel; stainless steel; dissimilar metal welds	Air indoor	Cumulative fatigue damage / fatigue	TLAA (Section 4.6.2)	II.A3-4 (C-13)	3.5.1-09	A
Personnel air lock, equipment hatch; locks, hinges and closure mechanisms	Structural support	Steel	Air indoor	Loss of leak tightness/ mechanical wear of locks, hinges and closure mechanisms	10 CFR Part 50, Appendix J Program	II.A3-5 (C-17)	3.5.1-17	A, 26
Personnel air lock, equipment hatch	Fire barrier	Steel	Air indoor	Loss of material/ general corrosion	Fire Protection Program	II.A3-6 (C-16)	3.5.1-18	E, 8

Table 3.5.2-7 Structures and Component Supports - Reactor Containment Vessels Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Personnel air lock, equipment hatch	Structural pressure barrier	Steel	Air indoor	Loss of material/ general corrosion	10 CFR Part 50, Appendix J Program	II.A3-6 (C-16)	3.5.1-18	A, 26, 8
Personnel air lock, equipment hatch	Structural pressure barrier	Steel	Air indoor	Loss of material/ general corrosion	ASME Section XI, Subsection IWE Program	II.A3-6 (C-16)	3.5.1-18	A, 26, 8
Moisture barriers (caulking)	Shelter protection	Elastomers	Air indoor	Loss of sealing; leakage through containment/ deterioration of joint seals, gaskets, and moisture barriers (caulking, flashing, and other sealants)	ASME Section XI, Subsection IWE Program	II.A3-7 (C-18)	3.5.1-16	A, 27
Seals, gaskets (gaskets/ O-rings in flanged closures for personnel air lock door seals, air lock operating shaft seals, electrical conductor penetrations, blind flanges)	Structural pressure barrier	Elastomers	Air indoor	Loss of sealing; leakage through containment/ deterioration of joint seals, gaskets, and moisture barriers (caulking, flashing, and other sealants)	10 CFR Part 50, Appendix J Program	II.A3-7 (C-18)	3.5.1-16	A

Table 3.5.2-7 Structures and Component Supports - Reactor Containment Vessels Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Seals, gaskets (gaskets/ O-rings in flanged closures for personnel air lock door seals, air lock operating shaft seals, electrical conductor penetrations, blind flanges)	Structural pressure barrier	Elastomers	Air indoor	Loss of sealing; leakage through containment/ deterioration of joint seals, gaskets, and moisture barriers (caulking, flashing, and other sealants)	ASME Section XI, Subsection IWE Program	II.A3-7 (C-18)	3.5.1-16	A
Masonry walls	Shielding	Concrete block	Air indoor	Cracking/ restraint, shrinkage, creep, and aggressive environment	Masonry Wall Program	III.A1-11 (T-12)	3.5.1-43	A, 28
Concrete (beams, columns, slabs, walls, equipment pedestals / supports, curbs, moveable covers / plugs, shielding)	HELB shielding, missile barrier, shelter protection, shielding, structural support	Reinforced concrete	Air indoor	None	None	III.A4-1 (T-10)	3.5.1-33	E
Concrete (biological shield wall)	HELB shielding, missile barrier, shelter protection, shielding, structural support	Reinforced concrete	Air indoor	Reduction of strength and modulus/ elevated temperature	Structures Monitoring Program	III.A4-1 (T-10)	3.5.1-33	E

Table 3.5.2-7 Structures and Component Supports - Reactor Containment Vessels Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (beams, columns, slabs, walls, equipment pedestals / supports, curbs, moveable covers / plugs, shielding, biological shield wall)	HELB shielding, missile barrier, shelter protection, shielding, structural support	Reinforced concrete	Air indoor	Cracking due to expansion/ reaction with aggregates	Structures Monitoring Program	III.A4-2 (T-03)	3.5.1-27	A
Concrete (beams, columns, slabs, walls, equipment pedestals / supports, curbs, moveable covers / plugs, shielding, biological shield wall)	HELB shielding, missile barrier, shelter protection, shielding, structural support	Reinforced concrete	Air indoor	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A4-3 (T-04)	3.5.1-23	A
Concrete (beams, columns, slabs, walls, equipment pedestals / supports, curbs, moveable covers / plugs, shielding, biological shield wall)	HELB shielding, missile barrier, shelter protection, shielding, structural support	Reinforced concrete	Air indoor	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A4-4 (T-06)	3.5.1-24	A

Table 3.5.2-7 Structures and Component Supports - Reactor Containment Vessels Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (columns, beams, connections, grating, embedments, sand plug frames, platforms, stairways, ladders, sump A covers, RPV missile shield assembly)	Structural support, direct flow, shelter protection, missile barrier	Steel	Air indoor	Loss of material/ corrosion	Structures Monitoring Program	III.A4-5 (T-11)	3.5.1-25	A, 31
Stainless steel components (refueling cavity liner)	Flood barrier, structural support	Stainless steel	Treated borated water	Loss of material/ crevice corrosion	Water Chemistry Program Monitoring of the spent fuel pool water level in accordance with Technical Specifications. Monitoring leakage from the leak chase channels.	III.A5-13 (T-14)	3.5.1-46	D, 10, 15
Stainless steel components (sump liners)	Structural support	Stainless steel	Treated borated water	Cracking/ stress corrosion cracking; loss of material/ pitting and crevice corrosion	Structures Monitoring Program	III.A5-13 (T-14)	3.5.1-46	E, 16

Table 3.5.2-7 Structures and Component Supports - Reactor Containment Vessels Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for refueling cavity miscellaneous component supports)	Structural support	Stainless steel	Treated borated water	Loss of material/ crevice corrosion	Water Chemistry Program	III.A5-13 (T-14)	3.5.1-46	D, 10
Support (building concrete at locations of expansion and grouted anchors; grout pads for support base plates supporting platforms, walkways, stairs, ladders, cranes, hoists, pipe whip restraints, jet impingement shields, masonry walls and other miscellaneous structures)	Structural support	Reinforced concrete, grout	Air indoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	III.B5-1 (T-29)	3.5.1-40	A
Stainless steel components (reactor cavity liner, refueling cavity liner, sump liner)	Flood barrier, structural support	Stainless steel	Air indoor	None	None	III.B5-5 (TP-05)	3.5.1-59	C

Table 3.5.2-7 Structures and Component Supports - Reactor Containment Vessels Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for platforms, walkways, stairs, ladders, cranes, hoists, pipe whip restraints, jet impingement shields, guard pipes, masonry walls and other miscellaneous structures)	HELB shielding, pipe whip restraint, structural support	Stainless steel	Air indoor	None	None	III.B5-5 (TP-05)	3.5.1-59	A
Stainless steel components (reactor cavity liner, refueling cavity liner, sump liner)	Flood barrier, structural support	Stainless steel	Air with borated water leakage	None	None	III.B5-6 (TP-04)	3.5.1-59	C

Table 3.5.2-7 Structures and Component Supports - Reactor Containment Vessels Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for platforms, walkways, stairs, ladders, cranes, hoists, pipe whip restraints, jet impingement shields, guard pipes, masonry walls and other miscellaneous structures)	HELB shielding, pipe whip restraint, structural support	Stainless steel	Air with borated water leakage	None	None	III.B5-6 (TP-04)	3.5.1-59	A
Support (members, connections, and anchorage to building structure for platforms, walkways, stairs, ladders, cranes, hoists, pipe whip restraints, jet impingement shields, guard pipes, masonry walls and other miscellaneous structures)	HELB shielding, pipe whip restraint, structural support	Steel	Air indoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B5-7 (T-30)	3.5.1-39	A, 7, 31

Table 3.5.2-7 Structures and Component Supports - Reactor Containment Vessels Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (columns, beams, grating, embedments, sand plug frames, platforms, stairways, ladders, sump A covers, RPV missile shield assembly)	Structural support, direct flow, shelter protection, missile barrier	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B5-8 (T-25)	3.5.1-55	C
Steel components (pressure vessel, penetration sleeves, embedded members)	Structural pressure barrier, structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B5-8 (T-25)	3.5.1-55	C
Support (members, connections, and anchorage to building structure for platforms, walkways, stairs, ladders, cranes, hoists, pipe whip restraints, jet impingement shields, guard pipes, masonry walls and other miscellaneous structures)	HELB shielding, pipe whip restraint, structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B5-8 (T-25)	3.5.1-55	A, 31

Table 3.5.2-7 Structures and Component Supports - Reactor Containment Vessels Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Stainless steel components (embedded members)	Structural support	Stainless steel	Embedded in concrete	None	None	VII.J-17 (AP-19)	3.3.1-96	C
Concrete (unreinforced concrete outside containment supporting containment bottom)	Structural support	Unreinforced concrete	Air indoor	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program			F, 23
Concrete (unreinforced concrete outside containment supporting containment bottom)	Structural support	Unreinforced concrete	Air indoor	Cracking due to expansion/ reaction with aggregates	Structures Monitoring Program			F, 23
Concrete (unreinforced concrete outside containment supporting containment bottom)	Structural support	Unreinforced concrete	Air indoor	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program			F, 23
Reactor containment vessel	Structural pressure barrier	Steel	Air indoor	Cumulative fatigue damage / fatigue	TLAA (Section 4.6.1)			H

Table 3.5.2-8 Structures and Component Supports - SBO Yard Structures - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (slabs, walls, and equipment foundations for Substation Control House, Cooling Tower Equipment House, and cable vault)	Structural support	Reinforced concrete	Air indoor	None	None	III.A3-1 (T-10)	3.5.1-33	E
Concrete (foundations and walls for Substation Control House, Cooling Tower Equipment House, transmission towers, transformers, disconnects, cable vault, and miscellaneous structures / equipment items)	Structural support	Reinforced concrete	Groundwater/ soil	None	None	III.A3-2 (T-03)	3.5.1-27	A

Table 3.5.2-8 Structures and Component Supports - SBO Yard Structures - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (foundations, slabs and walls for Substation Control House, Cooling Tower Equipment House, transmission towers, transformers, disconnects, cable vault, and miscellaneous structures / equipment items)	Structural support	Reinforced concrete	Air outdoor	Cracking due to expansion/ reaction with aggregates	Structures Monitoring Program	III.A3-2 (T-03)	3.5.1-27	A
Concrete (slabs, walls, and equipment foundations for Substation Control House, Cooling Tower Equipment House, and cable vault)	Structural support	Reinforced concrete	Air indoor	Cracking due to expansion/ reaction with aggregates	Structures Monitoring Program	III.A3-2 (T-03)	3.5.1-27	A

Table 3.5.2-8 Structures and Component Supports - SBO Yard Structures - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (foundations and walls for Substation Control House, Cooling Tower Equipment House, transmission towers, transformers, disconnects, cable vault, and miscellaneous structures / equipment items)	Structural support	Reinforced concrete	Groundwater/ soil	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A3-3 (T-08)	3.5.1-28	A, 1
Concrete (foundations, slabs and walls for Substation Control House, Cooling Tower Equipment House, transmission towers, transformers, disconnects, cable vault, and miscellaneous structures / equipment items)	Structural support	Reinforced concrete	Air outdoor	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A3-3 (T-08)	3.5.1-28	A, 1

Table 3.5.2-8 Structures and Component Supports - SBO Yard Structures - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (slabs, walls and equipment foundations for Substation Control House, Cooling Tower Equipment House, and cable vault)	Structural support	Reinforced concrete	Air indoor	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A3-3 (T-08)	3.5.1-28	A, 1
Concrete (foundations and walls for Substation Control House, Cooling Tower Equipment House, transmission towers, transformers, disconnects, cable vault, and miscellaneous structures / equipment items)	Structural support	Reinforced concrete	Groundwater/ soil	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A3-4 (T-05)	3.5.1-31	A

Table 3.5.2-8 Structures and Component Supports - SBO Yard Structures - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (foundations and walls for Substation Control House, Cooling Tower Equipment House, transmission towers, transformers, disconnects, cable vault, and miscellaneous structures / equipment items)	Structural support	Reinforced concrete	Groundwater/ soil	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A3-5 (T-07)	3.5.1-31	A
Concrete (foundations and walls for Substation Control House, Cooling Tower Equipment House, transmission towers, transformers, disconnects, cable vault, and miscellaneous structures / equipment items)	Structural support	Reinforced concrete	Groundwater/ soil	Loss of material (spalling, scaling) and cracking/ freeze-thaw	Structures Monitoring Program	III.A3-6 (T-01)	3.5.1-26	A

Table 3.5.2-8 Structures and Component Supports - SBO Yard Structures - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (foundations, slabs and walls for Substation Control House, Cooling Tower Equipment House, transmission towers, transformers, disconnects, cable vault, and miscellaneous structures / equipment items)	Structural support	Reinforced concrete	Air outdoor	Loss of material (spalling, scaling) and cracking/ freeze-thaw	Structures Monitoring Program	III.A3-6 (T-01)	3.5.1-26	A
Concrete (foundations and walls for Substation Control House, Cooling Tower Equipment House, transmission towers, transformers, disconnects, cable vault, and miscellaneous structures / equipment items)	Structural support	Reinforced concrete	Groundwater/ soil	None	None	III.A3-7 (T-02)	3.5.1-32	A

Table 3.5.2-8 Structures and Component Supports - SBO Yard Structures - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (foundations, slabs and walls for Substation Control House, Cooling Tower Equipment House, transmission towers, transformers, disconnects, cable vault, and miscellaneous structures / equipment items)	Structural support	Reinforced concrete	Air outdoor	Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide	Structures Monitoring Program	III.A3-7 (T-02)	3.5.1-32	A
Concrete (foundations for Substation Control House, Cooling Tower Equipment House, transmission towers, transformers, disconnects, cable vault, and miscellaneous structures / equipment items)	Structural support	Reinforced concrete, porous concrete	Groundwater/ soil	None	None	III.A3-8 (T-09)	3.5.1-29	A

Table 3.5.2-8 Structures and Component Supports - SBO Yard Structures - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (foundations, slabs and walls for Substation Control House, Cooling Tower Equipment House, transmission towers, transformers, disconnects, cable vault, and miscellaneous structures / equipment items)	Structural support	Reinforced concrete	Air outdoor	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A3-9 (T-04)	3.5.1-23	A
Concrete (slabs, walls, and equipment foundations for Substation Control House, Cooling Tower Equipment House, and cable vault)	Structural support	Reinforced concrete	Air indoor	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A3-9 (T-04)	3.5.1-23	A

Table 3.5.2-8 Structures and Component Supports - SBO Yard Structures - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (foundations, slabs and walls for Substation Control House, Cooling Tower Equipment House, transmission towers, transformers, disconnects, cable vault, and miscellaneous structures / equipment items)	Structural support	Reinforced concrete	Air outdoor	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A3-10 (T-06)	3.5.1-24	A
Concrete (slabs, walls, and equipment foundations for Substation Control House, Cooling Tower Equipment House, and cable vault)	Structural support	Reinforced concrete	Air indoor	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A3-10 (T-06)	3.5.1-24	A
Masonry walls (Cooling Tower Equipment House)	Structural support	Concrete block	Air indoor	Cracking/ restraint, shrinkage, creep, and aggressive environment	Structures Monitoring Program	III.A3-11 (T-12)	3.5.1-43	E, 30
Masonry walls (Cooling Tower Equipment House)	Structural support	Concrete block	Air outdoor	Cracking/ restraint, shrinkage, creep, and aggressive environment	Structures Monitoring Program	III.A3-11 (T-12)	3.5.1-43	E, 30

Table 3.5.2-8 Structures and Component Supports - SBO Yard Structures - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (structural steel members, connections, and anchorage for Substation Control House and Cooling Tower Equipment House, doors and metal siding)	Structural support	Steel	Air indoor	Loss of material/ corrosion	Structures Monitoring Program	III.A3-12 (T-11)	3.5.1-25	A, 31
Steel components (structural steel members, connections, and anchorage for Substation Control House, Cooling Tower Equipment House, transmission towers, transformers, disconnects, miscellaneous structures / equipment items, doors and metal siding)	Structural support	Steel	Air outdoor	Loss of material/ corrosion	Structures Monitoring Program	III.A3-12 (T-11)	3.5.1-25	A, 31

Table 3.5.2-8 Structures and Component Supports - SBO Yard Structures - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (building concrete at locations of expansion and grouted anchors; grout pads for support plates for platforms and miscellaneous structures)	Structural support	Reinforced concrete, grout	Air indoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	III.B5-1 (T-29)	3.5.1-40	A
Support (building concrete at locations of expansion and grouted anchors; grout pads for support plates for platforms and miscellaneous structures)	Structural support	Reinforced concrete, grout	Air outdoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	III.B5-1 (T-29)	3.5.1-40	A
Support (members, connections, and anchorage to building structure for platforms and miscellaneous structures)	Structural support	Steel	Air indoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B5-7 (T-30)	3.5.1-39	A, 7, 31

Table 3.5.2-8 Structures and Component Supports - SBO Yard Structures - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for platforms and miscellaneous structures)	Structural support	Steel	Air outdoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B5-7 (T-30)	3.5.1-39	A, 7, 31
High voltage insulator steel swivels	Structural support	Steel	Air outdoor	Loss of material caused by mechanical wear/ wind blowing on transmission conductors	Structures Monitoring Program	VI.A-10 (LP-11)	3.6.1-11	E

Table 3.5.2-9 Structures and Component Supports - Shield Buildings Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (embedded members)	Structural support	Steel	Embedded in concrete	None	None	II.A2-9 (C-09)	3.5.1-06	C
Concrete (walls, slabs, domes, equipment access hatches, equipment foundations, curbs)	Direct flow, flood barrier, missile barrier, shielding, structural support	Reinforced concrete	Air indoor	None	None	III.A1-1 (T-10)	3.5.1-33	E
Concrete (foundations)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	None	None	III.A1-2 (T-03)	3.5.1-27	A
Concrete (walls, domes, equipment access hatches and haunches)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Cracking due to expansion/ reaction with aggregates	Structures Monitoring Program	III.A1-2 (T-03)	3.5.1-27	A
Concrete (walls, slabs, domes, equipment access hatches, equipment foundations, curbs)	Direct flow, flood barrier, missile barrier, shielding, structural support	Reinforced concrete	Air indoor	Cracking due to expansion/ reaction with aggregates	Structures Monitoring Program	III.A1-2 (T-03)	3.5.1-27	A

Table 3.5.2-9 Structures and Component Supports - Shield Buildings Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (foundations)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A1-3 (T-08)	3.5.1-28	A, 1
Concrete (walls, domes, equipment access hatches)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A1-3 (T-08)	3.5.1-28	A, 1
Concrete (walls, slabs, domes, equipment access hatches, equipment foundations, curbs)	Direct flow, flood barrier, missile barrier, shielding, structural support	Reinforced concrete	Air indoor	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A1-3 (T-08)	3.5.1-28	A, 1
Concrete (foundations)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A1-4 (T-05)	3.5.1-31	A
Concrete (foundations)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A1-5 (T-07)	3.5.1-31	A

Table 3.5.2-9 Structures and Component Supports - Shield Buildings Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (foundations)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	Loss of material (spalling, scaling) and cracking/ freeze-thaw	Structures Monitoring Program	III.A1-6 (T-01)	3.5.1-26	A
Concrete (walls, domes, equipment access hatches)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Loss of material (spalling, scaling) and cracking/ freeze-thaw	Structures Monitoring Program	III.A1-6 (T-01)	3.5.1-26	A
Concrete (foundations)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	None	None	III.A1-7 (T-02)	3.5.1-32	A
Concrete (walls, domes, equipment access hatches)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide	Structures Monitoring Program	III.A1-7 (T-02)	3.5.1-32	A
Concrete (foundations, subfoundations)	Flood barrier, shelter protection, structural support	Reinforced concrete, porous concrete	Groundwater/ soil	None	None	III.A1-8 (T-09)	3.5.1-29	A

Table 3.5.2-9 Structures and Component Supports - Shield Buildings Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (walls, domes, equipment access hatches)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A1-9 (T-04)	3.5.1-23	A
Concrete (walls, slabs, domes, equipment access hatches, equipment foundations, curbs)	Direct flow, flood barrier, missile barrier, shielding, structural support	Reinforced concrete	Air indoor	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A1-9 (T-04)	3.5.1-23	A
Concrete (walls, domes, equipment access hatches)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A1-10 (T-06)	3.5.1-24	A
Concrete (walls, slabs, domes, equipment access hatches, equipment foundations, curbs)	Direct flow, flood barrier, missile barrier, shielding, structural support	Reinforced concrete	Air indoor	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A1-10 (T-06)	3.5.1-24	A

Table 3.5.2-9 Structures and Component Supports - Shield Buildings Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (structural steel members, connections, and anchorage for embedded steel, equipment access hatches)	Structural support	Steel	Air outdoor	Loss of material/ corrosion	Structures Monitoring Program	III.A1-12 (T-11)	3.5.1-25	A, 31
Steel components (structural steel members, connections, and anchorage for embedded steel, equipment access hatches, pipe sleeves, curbs, sump covers)	Direct flow, shielding, structural support	Steel	Air indoor	Loss of material/ corrosion	Structures Monitoring Program	III.A1-12 (T-11)	3.5.1-25	A, 31
Elastomers (seismic gap seals, equipment hatch concrete panel gap seals)	Expansion/ separation, shelter protection	Elastomers	Air outdoor	Loss of sealing/ deterioration of seals, gaskets, and moisture barriers	Structures Monitoring Program	III.A6-12 (TP-07)	3.5.1-44	C

Table 3.5.2-9 Structures and Component Supports - Shield Buildings Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Elastomers (seismic gap seals, Shield Building to Auxiliary Building interface caulk, flexible penetration seals at Shield Building wall, equipment hatch concrete panel gap seals)	Expansion/ separation, shielding	Elastomers	Air indoor	Loss of sealing/ deterioration of seals, gaskets, and moisture barriers	Structures Monitoring Program	III.A6-12 (TP-07)	3.5.1-44	C
Support (building concrete at locations of expansion and grouted anchors; grout pads for support base plates)	Structural support	Reinforced concrete, grout	Air indoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	III.B5-1 (T-29)	3.5.1-40	A
Stainless steel components (members, connections, and anchorage for pipe penetration assemblies at flexible boot seals, pipe sleeves, curbs)	Direct flow, shielding, structural support	Stainless steel	Air indoor	None	None	III.B5-5 (TP-05)	3.5.1-59	C

Table 3.5.2-9 Structures and Component Supports - Shield Buildings Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for miscellaneous structures)	Structural support	Stainless steel	Air indoor	None	None	III.B5-5 (TP-05)	3.5.1-59	A
Stainless steel components (members, connections, and anchorage for pipe penetration assemblies at flexible boot seals, pipe sleeves, curbs)	Direct flow, shielding, structural support	Stainless steel	Air with borated water leakage	None	None	III.B5-6 (TP-04)	3.5.1-59	C
Support (members, connections, and anchorage to building structure for miscellaneous structures)	Structural support	Stainless steel	Air with borated water leakage	None	None	III.B5-6 (TP-04)	3.5.1-59	A
Support (members, connections, and anchorage to building structure for platforms, stairs, ladders, and cages)	Structural support	Steel	Air indoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B5-7 (T-30)	3.5.1-39	A, 7, 31

Table 3.5.2-9 Structures and Component Supports - Shield Buildings Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (structural steel members, connections, and anchorage for embedded steel, equipment access hatches, pipe sleeves, curbs, sump covers)	Direct flow, shielding, structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B5-8 (T-25)	3.5.1-55	C, 31
Support (members, connections, and anchorage to building structure for platforms, stairs, ladders, and cages)	Structural support	Steel	Air with borated water leakage	Loss of material/ boric acid corrosion	Boric Acid Corrosion Program	III.B5-8 (T-25)	3.5.1-55	A, 31
Concrete (walls, domes, equipment access hatches)	Fire barrier	Reinforced concrete	Air indoor	Concrete cracking and spalling/ aggressive chemical attack, and reaction with aggregates	Fire Protection Program	VII.G-28 (A-90)	3.3.1-65	B
Concrete (walls, domes, equipment access hatches)	Fire barrier	Reinforced concrete	Air indoor	Concrete cracking and spalling/ aggressive chemical attack, and reaction with aggregates	Structures Monitoring Program	VII.G-28 (A-90)	3.3.1-65	A
Concrete (walls, domes, equipment access hatches)	Fire barrier	Reinforced concrete	Air indoor	Loss of material/ corrosion of embedded steel	Fire Protection Program	VII.G-29 (A-91)	3.3.1-67	B

Table 3.5.2-9 Structures and Component Supports - Shield Buildings Units 1 and 2 - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (walls, domes, equipment access hatches)	Fire barrier	Reinforced concrete	Air indoor	Loss of material/ corrosion of embedded steel	Structures Monitoring Program	VII.G-29 (A-91)	3.3.1-67	A
Concrete (walls, domes, equipment access hatches and haunches)	Fire barrier	Reinforced concrete	Air outdoor	Concrete cracking and spalling/ freeze-thaw, aggressive chemical attack, and reaction with aggregates	Fire Protection Program	VII.G-30 (A-92)	3.3.1-66	B
Concrete (walls, domes, equipment access hatches and haunches)	Fire barrier	Reinforced concrete	Air outdoor	Concrete cracking and spalling/ freeze-thaw, aggressive chemical attack, and reaction with aggregates	Structures Monitoring Program	VII.G-30 (A-92)	3.3.1-66	A
Concrete (walls, domes, equipment access hatches and haunches)	Fire barrier	Reinforced concrete	Air outdoor	Loss of material/ corrosion of embedded steel	Fire Protection Program	VII.G-31 (A-93)	3.3.1-67	B
Concrete (walls, domes, equipment access hatches and haunches)	Fire barrier	Reinforced concrete	Air outdoor	Loss of material/ corrosion of embedded steel	Structures Monitoring Program	VII.G-31 (A-93)	3.3.1-67	A

Table 3.5.2-10 Structures and Component Supports - Tank Foundations - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (fuel oil access pit manhole cover frames and miscellaneous embedded members)	Structural support	Steel	Embedded in concrete	None	None	II.A2-9 (C-09)	3.5.1-06	C
Support (members connections, and anchorage to foundation for fuel oil storage tank anti-flotation assemblies)	Structural support	Steel	Groundwater/ soil	Loss of material/ general, pitting, crevice, and microbiologically influenced corrosion	Structures Monitoring Program	III.A6-11 (T-21)	3.5.1-47	E, 4, 3, 31
Concrete (tank foundation mats and tank access pit walls and covers for fuel oil and condensate storage tanks)	Missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Cracking due to expansion/ reaction with aggregates	Structures Monitoring Program	III.A8-1 (T-03)	3.5.1-27	A
Concrete (tank foundation mats, buried tank mat and tank access pit walls and covers for fuel oil and condensate storage tanks)	Missile barrier, shelter protection, structural support	Reinforced concrete, unreinforced concrete	Groundwater/ soil	None	None	III.A8-1 (T-03)	3.5.1-27	A

Table 3.5.2-10 Structures and Component Supports - Tank Foundations - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (tank foundation mats and tank access pit walls and covers for fuel oil and condensate storage tanks)	Missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A8-2 (T-08)	3.5.1-28	A, 1
Concrete (tank foundation mats, buried tank mat and tank access pit walls and covers for fuel oil and condensate storage tanks)	Missile barrier, shelter protection, structural support	Reinforced concrete, unreinforced concrete	Groundwater/ soil	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A8-2 (T-08)	3.5.1-28	A, 1
Concrete (tank foundation mats and tank access pit walls and covers for fuel oil and condensate storage tanks)	Missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A8-3 (T-05)	3.5.1-31	A
Concrete (tank foundation mats, buried tank mat and tank access pit walls and covers for fuel oil and condensate storage tanks)	Missile barrier, shelter protection, structural support	Reinforced concrete, unreinforced concrete	Groundwater/ soil	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A8-3 (T-05)	3.5.1-31	A

Table 3.5.2-10 Structures and Component Supports - Tank Foundations - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (tank foundation mats and tank access pit walls and covers for fuel oil and condensate storage tanks)	Missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A8-4 (T-07)	3.5.1-31	A
Concrete (tank foundation mats, buried tank mat and tank access pit walls and covers for fuel oil and condensate storage tanks)	Missile barrier, shelter protection, structural support	Reinforced concrete, unreinforced concrete	Groundwater/ soil	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A8-4 (T-07)	3.5.1-31	A
Concrete (tank foundation mats and tank access pit walls and covers for fuel oil and condensate storage tanks)	Missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Loss of material (spalling, scaling) and cracking/ freeze-thaw	Structures Monitoring Program	III.A8-5 (T-01)	3.5.1-26	A
Concrete (tank foundation mats, buried tank mat and tank access pit walls and covers for fuel oil and condensate storage tanks)	Missile barrier, shelter protection, structural support	Reinforced concrete, unreinforced concrete	Groundwater/ soil	Loss of material (spalling, scaling) and cracking/ freeze-thaw	Structures Monitoring Program	III.A8-5 (T-01)	3.5.1-26	A

Table 3.5.2-10 Structures and Component Supports - Tank Foundations - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (tank foundation mats and tank access pit walls and covers for fuel oil and condensate storage tanks)	Missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide	Structures Monitoring Program	III.A8-6 (T-02)	3.5.1-32	A
Concrete (tank foundation mats, buried tank mat and tank access pit walls and covers for fuel oil and condensate storage tanks)	Missile barrier, shelter protection, structural support	Reinforced concrete, unreinforced concrete	Groundwater/ soil	None	None	III.A8-6 (T-02)	3.5.1-32	A
Concrete (foundations, subfoundations)	Structural support	Reinforced concrete, porous concrete	Groundwater/ soil	None	None	III.A8-7 (T-09)	3.5.1-29	A
Steel components (steel members, connections, and anchorage for fuel oil storage tank access pit manhole assemblies)	Structural support	Steel	Air outdoor	Loss of material/ corrosion	Structures Monitoring Program	III.A8-8 (T-11)	3.5.1-25	A, 31

Table 3.5.2-10 Structures and Component Supports - Tank Foundations - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (building concrete at locations of expansion and grouted anchors for condensate storage tanks)	Structural support	Reinforced concrete, grout	Air outdoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	III.B5-1 (T-29)	3.5.1-40	A
Support (building concrete at locations of expansion and grouted anchors for fuel oil storage tank anti-flotation assemblies)	Structural support	Reinforced concrete, grout	Groundwater/ soil	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	III.B5-1 (T-29)	3.5.1-40	A, 4, 29
Support (members, connections, and anchorage to foundation for condensate storage tanks)	Structural support	Steel	Air outdoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B5-7 (T-30)	3.5.1-39	A, 7, 31

Table 3.5.2-11 Structures and Component Supports - Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (Screenhouse and Emergency Cooling Water Intake crib embedded members)	Structural support	Steel	Embedded in concrete	None	None	II.A2-9 (C-09)	3.5.1-06	C
Concrete (Screenhouse diesel engine exhaust lines at concrete interface)	Structural support	Reinforced concrete	Air indoor	Reduction of strength and modulus/ elevated temperature	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A3-1 (T-10)	3.5.1-33	E
Concrete (Emergency Cooling Water Intake crib, emergency intake pipeline support, Screenhouse foundations, walls, slabs, Intake Canal concrete retaining walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	Structures Monitoring Program	III.A6-1 (T-18)	3.5.1-34	E

Table 3.5.2-11 Structures and Component Supports - Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (Emergency Cooling Water Intake crib, Screenhouse foundations, walls, slabs, Intake Canal concrete retaining walls)	Direct flow, flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil (accessible)	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-1 (T-18)	3.5.1-34	A, 5
Concrete (Screenhouse columns, beams, walls, slabs, equipment foundations, hatch covers)	Flood barrier, missile barrier, structural support	Reinforced concrete	Air indoor	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-1 (T-18)	3.5.1-34	A
Concrete (Screenhouse walls, slabs, hatch covers, Intake Canal concrete retaining walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Cracking, loss of bond, and loss of material (spalling, scaling)/ corrosion of embedded steel	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-1 (T-18)	3.5.1-34	A

Table 3.5.2-11 Structures and Component Supports - Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (Emergency Cooling Water Intake crib, emergency intake pipeline support, Screenhouse foundations, walls, slabs, Intake Canal concrete retaining walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	None	None	III.A6-2 (T-17)	3.5.1-36	A
Concrete (Emergency Cooling Water Intake crib, Screenhouse foundations, walls, slabs, Intake Canal concrete retaining walls)	Direct flow, flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil (accessible)	Cracking due to expansion/ reaction with aggregates	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-2 (T-17)	3.5.1-36	A, 5
Concrete (Screenhouse columns, beams, walls, slabs, equipment foundations, hatch covers)	Flood barrier, missile barrier, structural support	Reinforced concrete	Air indoor	Cracking due to expansion/ reaction with aggregates	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-2 (T-17)	3.5.1-36	A

Table 3.5.2-11 Structures and Component Supports - Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (Screenhouse walls, slabs, hatch covers, Intake Canal concrete retaining walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Cracking due to expansion/ reaction with aggregates	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-2 (T-17)	3.5.1-36	A
Concrete (Emergency Cooling Water Intake crib, emergency intake pipeline support, Screenhouse foundations, walls, slabs, Intake Canal concrete retaining walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	Structures Monitoring Program	III.A6-3 (T-19)	3.5.1-34	E
Concrete (Emergency Cooling Water Intake crib, Screenhouse foundations, walls, slabs, Intake Canal concrete retaining walls)	Direct flow, flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil (accessible)	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-3 (T-19)	3.5.1-34	A, 5

Table 3.5.2-11 Structures and Component Supports - Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (Screenhouse columns, beams, walls, slabs, equipment foundations, hatch covers)	Flood barrier, missile barrier, structural support	Reinforced concrete	Air indoor	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-3 (T-19)	3.5.1-34	A
Concrete (Screenhouse walls, slabs, hatch covers, Intake Canal concrete retaining walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-3 (T-19)	3.5.1-34	A
Concrete (Emergency Cooling Water Intake crib, emergency intake pipeline support, Screenhouse foundations, walls, slabs, Intake Canal concrete retaining walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A6-4 (T-08)	3.5.1-28	A, 1

Table 3.5.2-11 Structures and Component Supports - Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (Emergency Cooling Water Intake crib, Screenhouse foundations, walls, slabs, Intake Canal concrete retaining walls)	Direct flow, flood barrier, structural support, shelter protection	Reinforced concrete	Groundwater/ soil (accessible)	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A6-4 (T-08)	3.5.1-28	A, 1, 5
Concrete (Screenhouse columns, beams, walls, slabs, equipment foundations, hatch covers)	Flood barrier, missile barrier, structural support	Reinforced concrete	Air indoor	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A6-4 (T-08)	3.5.1-28	A, 1
Concrete (Screenhouse walls, slabs, hatch covers, Intake Canal concrete retaining walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Cracks and distortion/ increased stress levels from settlement	Structures Monitoring Program	III.A6-4 (T-08)	3.5.1-28	A, 1

Table 3.5.2-11 Structures and Component Supports - Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (Emergency Cooling Water Intake crib, emergency intake pipeline support, Screenhouse foundations, walls, slabs, Intake Canal concrete retaining walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	Loss of material (spalling, scaling) and cracking/ freeze-thaw	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-5 (T-15)	3.5.1-35	A
Concrete (Emergency Cooling Water Intake crib, Screenhouse foundations, walls, slabs, Intake Canal concrete retaining walls)	Direct flow, flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil (accessible)	Loss of material (spalling, scaling) and cracking/ freeze-thaw	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-5 (T-15)	3.5.1-35	A, 5
Concrete (Screenhouse walls, slabs, hatch covers, Intake Canal concrete retaining walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Loss of material (spalling, scaling) and cracking/ freeze-thaw	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-5 (T-15)	3.5.1-35	A

Table 3.5.2-11 Structures and Component Supports - Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (Emergency Cooling Water Intake crib, emergency intake pipeline support, Screenhouse foundations, walls, slabs, Intake Canal concrete retaining walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	None	None	III.A6-6 (T-16)	3.5.1-37	A
Concrete (Emergency Cooling Water Intake crib, Screenhouse foundations, walls, slabs, Intake Canal concrete retaining walls)	Direct flow, flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil (accessible)	Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-6 (T-16)	3.5.1-37	A, 5
Concrete (Screenhouse walls, slabs, hatch covers, Intake Canal concrete retaining walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Increase in porosity and permeability, loss of strength/ leaching of calcium hydroxide	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-6 (T-16)	3.5.1-37	A

Table 3.5.2-11 Structures and Component Supports - Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (Emergency Cooling Water Intake crib, emergency intake pipeline support, Screenhouse foundations, walls, slabs, Intake Canal concrete retaining walls)	Flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil	None	None	III.A6-7 (T-20)	3.5.1-45	A
Concrete (Emergency Cooling Water Intake crib, Screenhouse foundations, walls, slabs, Intake Canal concrete retaining walls)	Direct flow, flood barrier, shelter protection, structural support	Reinforced concrete	Groundwater/ soil (accessible)	Loss of material/ abrasion; cavitation	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-7 (T-20)	3.5.1-45	A, 5
Concrete (Screenhouse walls, slabs, hatch covers, Intake Canal concrete retaining walls)	Flood barrier, missile barrier, shelter protection, structural support	Reinforced concrete	Air outdoor	Loss of material/ abrasion; cavitation	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-7 (T-20)	3.5.1-45	A
Concrete (Screenhouse foundations, subfoundations)	Structural support	Reinforced concrete, porous concrete	Groundwater/ soil	None	None	III.A6-8 (T-09)	3.5.1-29	A

Table 3.5.2-11 Structures and Component Supports - Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Earthen water control structures (Intake Canal embankments)	Direct flow, shutdown cooling water	Soil, rip rap, engineered fill	Air outdoor	Loss of material, loss of form/ erosion, settlement, sedimentation, frost action, waves, currents, surface runoff, seepage	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-9 (T-22)	3.5.1-48	A
Earthen water control structures (Intake Canal embankments, Intake Canal and Approach Canal dredged channels)	Direct flow, shutdown cooling water	Soil, rip rap, engineered fill	Groundwater/ soil (accessible)	Loss of material, loss of form/ erosion, settlement, sedimentation, frost action, waves, currents, surface runoff, seepage	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-9 (T-22)	3.5.1-48	A, 2, 5
Steel components (Intake Canal sheet piling, Intake Canal sheet piling fasteners and Screenhouse fasteners, Emergency Cooling Water Intake crib members)	Flood barrier, structural support	Steel	Groundwater/ soil	Loss of material/ general, pitting, crevice, and microbiologically induced corrosion	Structures Monitoring Program	III.A6-11 (T-21)	3.5.1-47	E, 3, 4

Table 3.5.2-11 Structures and Component Supports - Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (Screenhouse trash racks, safeguards traveling screen frames, safeguards bay gates, fasteners, Intake Canal sheet piling, fasteners)	Flood barrier, structural support	Steel	Groundwater/ soil (accessible)	Loss of material/ general, pitting, crevice, and microbiologically induced corrosion	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-11 (T-21)	3.5.1-47	A, 3, 5
Steel components (structural steel members, connections and anchorage for main load carrying structural steel frame, Screenhouse pump drive base plates, flood bulkheads, man way covers, sump covers)	Flood barrier, structural support, direct flow	Steel	Air indoor	Loss of material/ general corrosion	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-11 (T-21)	3.5.1-47	A, 8, 31

Table 3.5.2-11 Structures and Component Supports - Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Steel components (structural steel members, connections and anchorage for Screenhouse pump drive base plates, man way covers, trash racks, safeguards traveling screen frames, Intake Canal sheet piling)	Flood barrier, structural support	Steel	Air outdoor	Loss of material/ general corrosion	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program	III.A6-11 (T-21)	3.5.1-47	A, 8, 31
Elastomers (Screenhouse flood bulkhead gaskets, stored flood bulkhead gaskets)	Flood barrier	Elastomers	Air indoor	Loss of sealing/ deterioration of seals, gaskets, and moisture barriers	Structures Monitoring Program	III.A6-12 (TP-07)	3.5.1-44	A
Elastomers (Screenhouse hatch cover seals)	Shelter protection	Elastomers	Air outdoor	Loss of sealing/ deterioration of seals, gaskets, and moisture barriers	Structures Monitoring Program	III.A6-12 (TP-07)	3.5.1-44	A

Table 3.5.2-11 Structures and Component Supports - Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (building concrete at locations of expansion and grouted anchors; grout pads for support base plates for Screenhouse platforms, stairs and other miscellaneous structures)	Structural support	Reinforced concrete, grout	Air indoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	III.B5-1 (T-29)	3.5.1-40	A
Support (building concrete at locations of expansion and grouted anchors; grout pads for support base plates for Screenhouse platforms, stairs and other miscellaneous structures)	Structural support	Reinforced concrete, grout	Air outdoor	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	III.B5-1 (T-29)	3.5.1-40	A

Table 3.5.2-11 Structures and Component Supports - Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Support (members, connections, and anchorage to building structure for Screenhouse platforms, stairs and other miscellaneous structures)	Structural support	Steel	Air indoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B5-7 (T-30)	3.5.1-39	A, 7, 31
Support (members, connections, and anchorage to building structure for Screenhouse platforms, stairs and other miscellaneous structures)	Structural support	Steel	Air outdoor	Loss of material/ general corrosion	Structures Monitoring Program	III.B5-7 (T-30)	3.5.1-39	A, 7, 31
Concrete (Screenhouse walls and slabs)	Fire barrier	Reinforced concrete	Air indoor	Concrete cracking and spalling/ aggressive chemical attack, and reaction with aggregates	Fire Protection Program	VII.G-28 (A-90)	3.3.1-65	B
Concrete (Screenhouse walls and slabs)	Fire barrier	Reinforced concrete	Air indoor	Concrete cracking and spalling/ aggressive chemical attack, and reaction with aggregates	Structures Monitoring Program	VII.G-28 (A-90)	3.3.1-65	A
Concrete (Screenhouse walls and slabs)	Fire barrier	Reinforced concrete	Air indoor	Loss of material/ corrosion of embedded steel	Fire Protection Program	VII.G-29 (A-91)	3.3.1-67	B

Table 3.5.2-11 Structures and Component Supports - Water Control Structures - Approach Canal, Emergency Cooling Water Intake, Intake Canal, and Screenhouse - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Concrete (Screenhouse walls and slabs)	Fire barrier	Reinforced concrete	Air indoor	Loss of material/ corrosion of embedded steel	Structures Monitoring Program	VII.G-29 (A-91)	3.3.1-67	A
Concrete (Screenhouse walls and slabs)	Fire barrier	Reinforced concrete	Air outdoor	Concrete cracking and spalling/ freeze-thaw, aggressive chemical attack, and reaction with aggregates	Fire Protection Program	VII.G-30 (A-92)	3.3.1-66	B
Concrete (Screenhouse walls and slabs)	Fire barrier	Reinforced concrete	Air outdoor	Concrete cracking and spalling/ freeze-thaw, aggressive chemical attack, and reaction with aggregates	Structures Monitoring Program	VII.G-30 (A-92)	3.3.1-66	A
Concrete (Screenhouse walls and slabs)	Fire barrier	Reinforced concrete	Air outdoor	Loss of material/ corrosion of embedded steel	Fire Protection Program	VII.G-31 (A-93)	3.3.1-67	B
Concrete (Screenhouse walls and slabs)	Fire barrier	Reinforced concrete	Air outdoor	Loss of material/ corrosion of embedded steel	Structures Monitoring Program	VII.G-31 (A-93)	3.3.1-67	A
Roofing (Screenhouse roof)	Shelter protection	Built-up roofing composite	Air outdoor	Separation, environmental degradation, water in-leakage/ weathering	Structures Monitoring Program			J, 6

Notes for Tables 3.5.2-1 through 3.5.2-11

A Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

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

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

D Component is different, but consistent with NUREG-1801 for material, environment, and aging effect. AMP takes 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 for this component.

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

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

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

J Neither the component nor the material and environment combination are evaluated in NUREG-1801.

Plant-specific notes:

1 Cracks and distortion due to increased stress levels from settlement are not expected to occur based on plant-specific evaluation. To ensure unexpected settlement does not occur, the Structures Monitoring Program manages the aging effects. For the inaccessible groundwater/soil environment, the concrete condition in accessible areas is used to evaluate the condition of the concrete in inaccessible areas. The NUREG-1801 line item that addresses settlement includes the environment “Soil” and the component “Concrete: All.” “Concrete: All” would include those environments applicable to all concrete components. To manage settlement for all concrete, the AMR considers all plant environments including air indoor, air outdoor, groundwater (accessible) and groundwater/soil.

2 The river bottom elevation at the Approach Canal out to the main river channel is to be maintained at an elevation lower than the minimum water level (i.e. 666.5 ft) following the design basis event addressed in USAR Section 10.4.1.2.2 to ensure water will flow into the

Emergency Cooling Water Intake crib located in the Approach Canal. River bottom elevation in the vicinity of the Emergency Cooling Water Intake crib is to be maintained below the top of the intake concrete structure elevation 662.0 ft.

3 Aging mechanism(s) not in NUREG-1801.

4 The component is buried and inaccessible for examination. The Structures Monitoring Program requires examination of buried structural members whenever the surrounding soil is excavated. Observed condition of excavated members is used as a basis for evaluating the condition of inaccessible structural members.

5 SSC submerged in river (raw) water and accessible for diver examinations are identified as being in groundwater/soil (accessible) environment.

6 Roofing components are not provided in NUREG-1801. PINGP plant-specific evaluation source document ACI 349.3R provided aging effects for roofing to include separation, environmental degradation, water in-leakage due to weathering.

7 NUREG-1801 line item includes the aging effect loss of material due to general and pitting corrosion. Loss of material due to pitting corrosion is not applicable at PINGP since the air indoor and air outdoor environments do not contain aggressive contaminants and are not continuously wetted.

8 NUREG-1801 includes the aging effect loss of material due to general, pitting, and crevice corrosion. Loss of material due to pitting and crevice corrosions is not applicable at PINGP since air indoor and air outdoor environments do not contain aggressive contaminants and are not continuously wetted.

9 PINGP plant-specific evaluation did not identify any aging effect or mechanism for this material/environment combination.

10 NUREG-1801 line item includes the aging effects cracking due to stress corrosion cracking (SCC) and loss of material due to pitting and crevice corrosion. Cracking due to SCC of stainless steel in a treated borated water environment is not applicable at PINGP since the spent fuel pool, transfer canal, and refueling cavity treated borated water temperatures do not exceed industry limit of 140 degrees F. Loss of material due to pitting corrosion of stainless steel in a treated borated water environment is not applicable at PINGP since chloride, fluoride, and sulfate concentrations do not exceed 150 ppb. Loss of material due to crevice corrosion of stainless steel in a treated borated water environment is applicable since the treated borated water environments are low flow, and the oxygen content is above the threshold of 100 ppb. Therefore NUREG-1801 line item includes the aging effect loss of material due to crevice corrosion. To ensure the water chemistry remains non-aggressive, the Water Chemistry Program is specified as a confirmatory AMP.

11 Not used.

12 The PINGP new fuel pit bottom contains a layer of sand approximately 2'-3" thick topped with a 9" thick concrete slab that incorporates water stops. Wood planking is placed on top of the concrete slab at locations that correspond with the fuel racks. A concrete enclosure covers the new fuel pit. Since the wood planking is treated wood and is located in an air indoor environment, no aging effects are applicable.

13 Aluminum roof hatch (hatch over concrete roof plug) is not susceptible to aging since the PINGP air outdoor environment is non-aggressive and dissimilar metal hatch connections are not used.

14 NUREG-1801 line item includes the aging effect loss of material due to pitting and crevice corrosion where applicable. Loss of material due to pitting and crevice corrosion is not applicable at PINGP since the air outdoor environment does not contain aggressive contaminants and is not continuously wetted.

15 The Water Chemistry Program is supplemented by monitoring of the spent fuel pool water level in accordance with Technical Specifications. Additionally, plant procedures require periodic monitoring of the spent fuel pool leak detection system.

16 NUREG-1801 line item material/environment combination is used to identify stainless steel sump liners in treated borated water. The Structures Monitoring Program is used to manage the aging effects cracking due to stress corrosion cracking and loss of material due to pitting and crevice corrosion for stainless steel sump liners rather then the NUREG referenced Water Chemistry Program since water quality in the sumps is not monitored.

17 The steam generator supports for Unit 2 use high strength VASCOMAX 250 CVM bolting material and the reactor coolant pump supports for Units 1 and 2 use high strength VASCOMAX 300 bolting material. The steam generator support bolts for Unit 1 are A193 Gr. B7 material with a yield strength of 117 ksi based on actual test results of procured material. Therefore stress corrosion cracking is not applicable for the A193 Gr. B7 bolts.

18 Plant-specific review determined the potential use of dissimilar metal connections and therefore loss of material due to galvanic corrosion for aluminum is possible. In an outdoor environment that does not contain aggressive contaminants and is not continuously wetted, pitting and crevice corrosion are not applicable for aluminum.

19 It is possible that vibratory motion of the fuel oil storage vault roof slab during its use as an access roadway could cause gradual weakening and spalling in stress concentration areas. The Structures Monitoring Program is used to manage cracking and spalling due to fatigue due to low level repeated load.

20 Structural concrete fire barriers (wall, ceilings and floors) are evaluated for aging in the building AMR where they reside as are fire barrier masonry walls. Structural concrete at hydrant houses is evaluated in the Fire Protection Barriers AMR.

21 Not used.

22 For inaccessible components embedded in concrete including the pressure vessel, penetration sleeves, and miscellaneous embedded members, aging management is not required since the NUREG-1801 applicability criteria for this line item have been satisfied and therefore the aging effect is not significant.

23 This line item addresses the unreinforced concrete placed between the Shield Building base mat / wall and the elliptical bottom head of the Reactor Containment Vessel. The top of the unreinforced concrete, which extends across the annular space between the Containment and Shield Building, is exposed to an indoor air environment. Elsewhere the unreinforced concrete is in contact with either the containment bottom head or the reinforced concrete Shield Building. The reinforced concrete base mat below the unreinforced concrete is an integral part of the Shield Building and is evaluated with the Shield Building. Since the unreinforced concrete is exposed to air indoor and embedded in concrete environments, the aging mechanisms settlement, reaction with aggregate and aggressive chemical attack are applicable, while elevated temperature, corrosion of embedded steel, leaching of calcium hydroxide, erosion of porous concrete subfoundation and freeze-thaw do not apply.

24 Not used.

25 Category E-B (ASME B&PV Code Section XI, Sub-Section IWE, Table IWE-2500-1 Examination Category EB, visual VT-1 examination method) and pressure retaining dissimilar metal welds Category E-F (Table IWE-2500-1 Examination Category EF, surface examination method) for penetration bellows and penetration sleeves are recommended for the extended period of operations per NUREG-1801. PINGP operating history on bellow replacements revealed no significant age-related issues. Industry operating history identified cracks in the bellows but did not identify cracks of the weld metal. Welds for penetration bellow assemblies are in a sheltered, non-corrosive environment. Additionally, welds are located outside primary containment in an air indoor environment where temperatures are not expected to exceed threshold limits for stress corrosion cracking. In light of the non-aggressive environment and plant-specific and industry operating histories, weld examinations utilizing optional Examination Categories E-B and E-F are not warranted. Existing requirements for visual weld examinations with the adjacent base metal in accordance with ASME Section XI, Subsection IWE, Examination Category E-A and 10 CFR50, Appendix J leak rate testing (Examination Category E-P) are sufficient to detect weld cracking and loss of material for penetration sleeves and bellows. Therefore pressure

retaining welds and pressure retaining dissimilar metal welds will not receive separate VT-1 or surface examinations unless these items are designated for augmented examination (Table IWE-2500-1 Examination Category EC) in accordance with IWE-1240.

26 The personnel air lock is monitored for leakage as required by the plant Technical Specifications. The equipment hatch is closed with a bolted cover and does not utilize locks, hinges or closure mechanisms.

27 Containment penetration seals and moisture barriers (containment vessel / concrete interface caulking) are identified as separate line items since the former are pressure retaining elements and the latter are not.

28 NUREG-1801, Chapter II (Containment Structures) does not include a line item for masonry walls. The line item shown, listed in Chapter III.A under the Group 1 Structures category identifies the aging management program applicable to the masonry shield wall adjacent to the Unit 1 Reactor Coolant Drain Tank.

29 Concrete anchors used on below grade fuel oil storage tank anti-flotation assemblies are not expected to experience any movement. The Structures Monitoring Program contains provisions to inspect structural members whenever inaccessible areas are excavated, exposed, or modified.

30 These masonry walls are not safety related, and are relied upon to perform a function that demonstrates compliance with a regulated event(s).

31 The Bolting Integrity Program provides preventive measures and maintenance practices for structural bolting.

32 A review of PINGP operating experience confirms that insulation failures have not adversely impacted the satisfactory accomplishment of a safety related intended function. Therefore, based upon the material, environment, and operating experience, the insulation is not expected to degrade, and an AMP is not required.

3.6 Aging Management of Electrical and Instrumentation and Controls

3.6.1 Introduction

Section 3.6 provides the results of the AMR for those electrical commodity groups listed below, and identified in Section 2.5, Scoping and Screening Results - Electrical and Instrumentation and Control (I&C) Commodity Groups, that require AMR. The following non-EQ electrical commodity groups were subject to AMR to determine which electrical commodity groups and materials require aging management.

- Cables and Connections (Insulation), includes splices, terminations, fuse blocks and connectors (Section 2.5.1)
- Cables and Connections Used in Instrumentation Circuits (Insulation), sensitive to reduction in conductor insulation resistance (Section 2.5.2)
- Inaccessible Medium Voltage Cables and Connections (Insulation), underground, buried (Section 2.5.3)
- Electrical Connector Contacts (metallic connector pins exposed to borated water) (Section 2.5.4)
- Electrical Penetrations (electrical insulation portions) (Section 2.5.5)
- Metal Enclosed Bus and Connections (Bus/Connections, Enclosure Assemblies, Insulation/Insulators) (Section 2.5.6)
- Fuse Holders (metallic parts), not part of a larger active assembly (Section 2.5.7)
- Cable Connections (metallic parts) (Section 2.5.8)
- Switchyard Bus and Connections (Section 2.5.9)
- Transmission Conductors and Connections (Section 2.5.10)
- High-Voltage Insulators (Section 2.5.11)

Table 3.6.1, Summary of Aging Management Evaluations in Chapter VI of NUREG-1801 for Electrical Components, provides the summary of the programs evaluated in NUREG-1801 for the Electrical components that are relied on for License Renewal. This table uses the format described in Section 3.0. Note that this table only includes those components that are applicable to a PWR.

3.6.2 Results

The following table summarizes the results of the AMR for electrical components in the Electrical Components group:

Table 3.6.2-1, Electrical Components - Electrical Commodity Groups - Summary of Aging Management Evaluation

The materials that specific components are fabricated from, the environments to which components are exposed, the potential aging effects requiring management, and the AMPs used to manage these aging effects are provided in the following subsections of Section 3.6.2.1, Materials, Environment, Aging Effects Requiring Management and Aging Management Programs:

Section 3.6.2.1.1, Cables and Connections (Insulation), includes splices, terminations, fuse blocks and connectors

Section 3.6.2.1.2, Cables and Connections Used in Instrumentation Circuits (Insulation), sensitive to reduction in conductor insulation resistance

Section 3.6.2.1.3, Inaccessible Medium Voltage Cables and Connections (Insulation), underground, buried

Section 3.6.2.1.4, Electrical Connector Contacts (metallic connector pins exposed to borated water)

Section 3.6.2.1.5, Electrical Penetrations (electrical insulation portions)

Section 3.6.2.1.6, Metal Enclosed Bus and Connections (Bus/Connections, Enclosure Assemblies, Insulation/Insulators)

Section 3.6.2.1.7, Fuse Holders (metallic parts), not part of a larger assembly

Section 3.6.2.1.8, Cable Connections (metallic parts)

Section 3.6.2.1.9, Switchyard Bus and Connections

Section 3.6.2.1.10, Transmission Conductors and Connections

Section 3.6.2.1.11, High-Voltage Insulators

3.6.2.1 Materials, Environment, Aging Effects Requiring Management and Aging Management Programs

NUREG-1801 Volume 1 Tables provide the basis for identifying those programs that warrant further evaluation by the reviewer in the LRA. For the non-EQ Electrical and Instrumentation and Controls, those programs address:

3.6.2.1.1 Cables and Connections (Insulation), Includes Splices, Terminations, Fuse Blocks and Connectors

Materials

The materials of construction of the insulation portion for the cables and connections (insulation), includes splices, terminations, fuse blocks and connectors are:

- Various Organic Polymers

The materials of construction of the conductor for the cables and connections (insulation), includes splices, terminations, fuse blocks and connectors are:

- Copper alloys and other metals

Environments

The cables and connections (insulation) are exposed to the environment:

- Adverse localized environment

Aging Effects Requiring Management

The aging effects, associated with the cables and connections (insulation), that require aging management are:

- Reduced insulation resistance
- Electrical failure

Aging Management Programs

The AMP that manages the aging effects for the cables and connections (insulation) is:

- Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program

3.6.2.1.2 **Cables and Connections Used in Instrumentation Circuits (Insulation), Sensitive to Reduction in Conductor Insulation Resistance**

Materials

The materials of construction of the insulation portion for the cables and connections used in instrumentation circuits (insulation), sensitive to reduction in conductor insulation resistance are:

- Various Organic Polymers

Environments

The cables and connections used in instrumentation circuits (insulation), sensitive to loss of insulation resistance are exposed to the following environment:

- Adverse localized environment

Aging Effects Requiring Management

The aging effects, associated with the cables and connections used in instrumentation circuits (insulation), sensitive to reduction of conductor insulation resistance, that require aging management are:

- Reduced insulation resistance
- Electrical failure

Aging Management Programs

The AMP that manages the aging effects for the cables and connections used in instrumentation circuits (insulation), sensitive to reduction of conductor insulation resistance is:

- Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program

3.6.2.1.3 Inaccessible Medium Voltage Cables and Connections (Insulation), Underground, Buried

Materials

The materials of construction of the insulation portion for the inaccessible medium voltage cables and connections (insulation), underground, buried are:

- Various Organic Polymers

Environments

The inaccessible medium voltage cables and connections (insulation), underground, buried, are exposed to the environments:

- Moisture and voltage stress

Aging Effects Requiring Management

The aging effects, associated with the inaccessible medium voltage cables and connections (insulation), underground, buried, that require aging management are:

- Reduced insulation resistance (formation of water trees)
- Electrical failure

Aging Management Programs

The AMP that manages the aging effects for the inaccessible medium voltage cables and connections (insulation), underground, buried is:

- Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program

3.6.2.1.4 Electrical Connector Contacts (Metallic Connector Pins Exposed to Borated Water)

Materials

The materials of construction of the metallic conductor portion of the electrical connector contacts (metallic connector pins exposed to borated water) are:

- Various metals (connector pins)

Environments

The electrical connector contacts (metallic connector pins exposed to borated water) are exposed to the environment:

- Borated water leakage

Aging Effects Requiring Management

The aging effect, associated with the electrical connector contacts (metallic connector pins exposed to borated water), that requires aging management is:

- Electrical failure (from corrosion)

Aging Management Programs

The AMP that manages the aging effects for the electrical connector contacts (metallic connector pins exposed to borated water) is:

- Boric Acid Corrosion Program

3.6.2.1.5 Electrical Penetrations (Electrical Insulation Portions)

Materials

The materials of construction of the insulation portion for the electrical penetrations (electrical insulation portions) are:

- Various Organic Polymers

Environment

The electrical penetrations (electrical insulation portions) are exposed to an Air/Gas environment, and not exposed to adverse ambient environments. This electrical commodity group is conservatively included as exposed to the environment:

- Adverse localized environment

Aging Effects Requiring Management

The following aging effects, associated with the electrical penetrations (electrical insulation portions), that require aging management are:

- Reduced insulation resistance
- Electrical failure

Aging Management Programs

The AMP that manages the aging effects for the accessible electrical penetration portions (pigtails) is:

- Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program

3.6.2.1.6 Metal Enclosed Bus and Connections (Bus/Connections, Enclosure Assemblies, Insulation/Insulators)

Materials

The materials of construction for the metal enclosed bus and connections (bus/connections, enclosure assemblies, insulation/insulators) are:

- Copper & Aluminum (Bus/Connections)
- Steel (enclosure assemblies)
- Elastomers (enclosure assembly seals)
- Various Organic Polymers (insulation)
- Porcelain Bushings (insulators)

Environments

The metal enclosed bus and connections (bus/connections, enclosure assemblies, insulation/insulators) are exposed to the environments:

- Atmosphere/Weather
- Air/Gas

Aging Effects Requiring Management

The aging effects, associated with the metal enclosed bus and connections (bus/connections, enclosure assemblies, insulation/insulators), that require aging management are:

- Reduced insulation resistance
- Electrical failure
- Loose connections (localized heating)
- Loss of material/general corrosion (enclosure assemblies)
- Hardening and loss of strength/elastomer degradation (enclosure seals)

Aging Management Programs

The AMPs that manage the aging effects for the metal enclosed bus and connections (bus/connections, enclosure assemblies, insulation/insulators) are:

- Metal-Enclosed Bus Program
- Structures Monitoring Program

3.6.2.1.7 Fuse Holders (Metallic Parts), Not Part of a Larger Assembly

Materials

The materials of construction for the fuse holders (metallic parts), not part of a larger assembly, are:

- Copper alloys and other metals

Environment

The fuse holders (metallic parts), not part of a larger assembly, are exposed to the environments:

- Adverse localized environment (causing corrosion and/or fatigue)
- Mechanical Cycling

Aging Effects Requiring Management

The aging effects, associated with the fuse holders (metallic parts), not part of a larger active assembly, that require aging management are:

- Increased contact resistance (corrosion and/or fatigue)
- Electrical failure

Aging Management Programs

The AMP that manages the aging effects for the fuse holders (metallic parts), not part of a larger active assembly is:

- Fuse Holders Program

3.6.2.1.8 Cable Connections (Metallic Parts)

Materials

The materials of construction for the cable connections (metallic parts) are:

- Various metals

Environment

The cable connections (metallic parts) are exposed to the environments:

- Atmosphere/Weather
- Air/Gas

Aging Effects Requiring Management

The aging effects, associated with the cable connections (metallic parts), that require aging management are:

- Loose connections (localized heating)
- Electrical failure

Aging Management Programs

The AMP that manages the aging effects for the cable connections (metallic parts) is:

- Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program

3.6.2.1.9 Switchyard Bus and Connections

Materials

The materials of construction for the switchyard bus and connections are:

- Aluminum
- Aluminum Alloy (Bolting)

Environments

The switchyard bus and connections are exposed to the environment:

- Atmosphere/Weather

Aging Effects Requiring Management

No aging effects, associated with the switchyard bus and connections, requiring aging management were identified. See Section 3.6.2.2.3 for details.

Aging Management Programs

None

3.6.2.1.10 Transmission Conductors and Connections

Materials

The materials of construction for transmission conductors and connections are:

- Steel
- Aluminum

Environments

The transmission conductors and connections are exposed to the environment:

- Atmosphere/Weather

Aging Effects Requiring Management

No aging effects, associated with the transmission conductors and connections, requiring aging management were identified. See Section 3.6.2.2.3 for details.

Aging Management Programs

None

3.6.2.1.11 High-Voltage Insulators

Materials

The materials of construction for the high-voltage insulators are:

- Porcelain
- Cement
- Metal

Environments

The high-voltage insulators are exposed to the environment:

- Atmosphere/Weather

Aging Effects Requiring Management

The aging effect, associated with the high-voltage insulators, that requires aging management is:

- Loss of Material (mechanical wear of metal support)

Aging Management Programs

The AMP that manages the aging effects for the high-voltage insulators is:

- Structures Monitoring Program

3.6.2.2 Further Evaluation of Aging Management as Recommended by NUREG-1801

NUREG-1801 Volume 1 Tables provide the basis for identifying those programs that warrant further evaluation by the reviewer in the LRA. For the Electrical and Instrumentation and Controls, those programs are addressed in the following sections.

3.6.2.2.1 Electrical Equipment Subject to Environmental Qualification

Environmental qualification of electrical equipment is a TLAA as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). This TLAA is addressed in Section 4.4 of the LRA.

3.6.2.2.2 Degradation of Insulator Quality due to Presence of Any Salt Deposits and Surface Contamination, and Loss of Material due to Mechanical Wear

The high-voltage insulators, this included high voltage strain and suspension insulators that perform the function of insulating and supporting electrical transmission conductors, subject to an AMR (1) are constructed of porcelain, galvanized metal, and cement, (2) are exposed to an outdoor weather environment consisting of temperatures up to 40°C (104°F), precipitation, and negligible radiation, (3) insulate and support an electrical conductor, and (4) require no AMP. PINGP did not identify any aging effects from the outside environment (consisting of temperatures up to 40°C (104°F) and precipitation that would cause the loss of the capability to insulate or support its associated electrical conductor.

Regarding the potential for contamination of insulators, the buildup of surface contamination is gradual and is washed away by rain; the glazed insulator surface aids this contamination removal. A large buildup of contamination enables the conductor voltage to track along the surface more easily and can lead to insulator flashover. Surface contamination can be a problem in areas where there are greater concentrations of airborne particles such as near facilities that discharge soot or near the seacoast where salt spray is prevalent. PINGP is located in an area with moderate rainfall where airborne particle concentrations are comparatively low; consequently, the rate of contamination buildup on the insulators is not significant. At PINGP, contamination build-up on insulators is not a problem due to rainfall periodically "washing" the insulators. Additionally, there is no nearby heavy industry or other producers of industrial effluents, which could cause excessive contamination. There is no salt spray at PINGP as the plant is far from any ocean. Therefore, surface contamination is not an applicable aging effect for the insulators in the service conditions they are exposed to at PINGP.

Regarding high voltage porcelain insulator cracking, porcelain is essentially a hardened, opaque glass. As with any glass, if subjected to enough force it will crack or break. A common cause for cracking or breaking of an insulator is being struck by an object. Cracking and breaking caused by physical damage is not an aging effect and is not subject to an AMR. Cracks have been known to occur with insulators when the cement that binds the parts together expands enough to crack the porcelain. This phenomenon, known as cement growth, occurs mainly because of improper manufacturing processes or materials, which make the cement more susceptible to moisture penetration, and the specific design and application of the insulator. The string insulators susceptible to porcelain cracking caused by cement growth are isolated to bad batches (specific, known brands and manufacture dates). Research of corrective action documents within the PINGP database revealed no instance of insulator cracking or failure related to cement growth at the PINGP switchyard. Accordingly, cracking due to cement growth is not an applicable aging effect for the high voltage insulators in the service conditions they are exposed to at PINGP. Therefore the electrical insulation materials (porcelain and cement) require no aging management.

Regarding mechanical wear, this is an aging effect for strain and suspension insulators (structural metallic portions) in that they are subject to movement. Movement of the insulators can be caused by wind blowing the supported transmission conductor, causing it to swing from side to side. If this swinging is frequent enough, it could cause wear in the metal contact points of the insulator string and between an insulator and the supporting hardware. Although this mechanism is possible, experience has shown that the transmission conductors do not normally swing and that when they do, due to a substantial wind, the transmission conductors do not continue to swing once the wind has subsided. Wind loading that can cause a transmission line and insulators to vibrate or sway is considered in the design and installation. The loss of material due to wear concern will be conservatively managed under a structural aging management program.

PINGP operating experience was reviewed to validate aging effects for switchyard insulators (electrical insulation portion). This review included corrective action documents for any documented instances of switchyard insulator aging. No instance of aging related problems with in-scope switchyard insulators due to contaminants, cracking, or cement growth was uncovered.

In conclusion PINGP determined that an environment consisting of temperatures up to 40°C (104°F) and precipitation has no significant aging effect on porcelain and cement (the electrical insulation materials from which high voltage insulators are constructed). Therefore, no electrical AMP is required for the PINGP High-Voltage Insulators (electrical insulation portion).

Loss of material caused by mechanical wear due to wind blowing on transmission high voltage insulator steel swivels is an aging effect that could occur and therefore is managed by the Structures Monitoring Program.

3.6.2.2.3 Loss of Material due to Wind Induced Abrasion and Fatigue, Loss of Conductor Strength due to Corrosion, and Increased Resistance of Connection due to Oxidation or Loss of Pre-load

The PINGP transmission conductor component type includes transmission conductors and the hardware used to secure the conductors to the insulators. The materials for aluminum cable-steel reinforced (ACSR) transmission conductors are aluminum and steel, and the environment is outdoor weather. Based on industry guidance, potential aging effects and aging mechanisms are loss of conductor strength due to general corrosion (atmospheric oxidation of metals).

Corrosion in ACSR conductors is a slow acting mechanism. Corrosion rates are dependent on air quality. PINGP is located in an agricultural area with no nearby industries that could contribute to corrosive air quality. Corrosion testing of transmission conductors at Ontario Hydroelectric showed a 30 percent loss of composite conductor strength of an 80-year-old ACSR conductor. The Institute of Electrical and Electronic Engineers National Electrical Safety Code (NESC) requires that tension on installed conductors be a maximum of 60% of the ultimate conductor strength. Therefore, assuming a 30% loss of strength, there would be remaining margin between what is required by the NESC and the actual conductor strength. In determining actual conductor tension, the NESC considers various loads imposed by ice, wind, and temperature as well as length of conductor span. PINGP transmission conductors in scope for License Renewal are short spans located within the PINGP site, and are designed for heavy loading; therefore, the Ontario Hydroelectric heavy loading zone study is aligned with respect to loads imposed by weather conditions.

The 636 MCM ACSR transmission conductor used in the PINGP Switchyard will be used as an illustration. The ultimate strength of a 636 MCM (24/7 strands) ACSR conductor is 22,600 lbs and the maximum design tension for this conductor is 3,500 lbs. The margin between the maximum design tension and the ultimate strength is 19,100 lbs. Therefore, there is an 84.5% ultimate strength margin (19,100/22,600). The Ontario Hydroelectric study showed a 30% loss of composite conductor strength in an 80-year old conductor. Since the margin for the PINGP conductors is greater than the margin loss due to aging, remaining safety margin exists on the aged conductors.

The Ontario Hydroelectric test results demonstrate that the expected material loss that would be incurred on the PINGP ACSR transmission conductors is acceptable for the period of extended operation. Therefore, no aging management is required for loss of material and loss of strength on the ACSR transmission conductors at PINGP.

The switchyard bus and connections subject to an AMR (1) are constructed of aluminum and aluminum alloy (bolting), (2) are exposed to an atmosphere/weather (same as Air-Outdoor) environment consisting of temperatures up to 40°C (104°F), precipitation, and negligible radiation, (3) provide electrical connections to specific sections of an electrical circuit to deliver voltage, current or signals, and (4) require no AMP. There are no aging effects from the outdoor environment (consisting of temperatures up to 40°C (104°F) and precipitation) that would cause the loss of the capability to provide electrical connections to specified sections of an electrical circuit to deliver voltage, current, or signals. PINGP currently performs periodic thermography and visual inspection of switchyard connections.

In conclusion PINGP determined that an environment consisting of temperatures up to 40°C (104°F) and precipitation has no significant aging effect on aluminum and aluminum alloy. PINGP already maintains an existing inspection program on switchyard connections, and does not require a License Renewal program. Therefore, no License Renewal AMP is required for High-Voltage Switchyard Bus and Connections. PINGP reviewed industry operating experience and NRC generic communications related to the aging of transmission conductors in order to ensure that no additional aging effects exist beyond those identified above.

PINGP also reviewed plant-specific operating experience, including nonconformance reports, licensee event reports, and condition reports. PINGP's review did not identify unique aging effects for transmission conductors beyond those identified above.

In conclusion, no License Renewal aging management program is required for the PINGP transmission conductors and connections aging effects of loss of conductor strength and loss of material (mechanical wear).

3.6.2.3 Time-Limited Aging Analyses

The TLAAs identified below are associated with the Electrical and Instrumentation and Controls components. The section of the LRA that contains the TLAA review results is indicated in parenthesis.

- Environmental Qualification of Electrical Components (Section 4.4)

3.6.3 Conclusion

The Electrical and Instrumentation and Controls components that are subject to an AMR have been identified in accordance with the requirements of 10 CFR 54.4. The AMPs selected to manage aging effects for the Electrical and Instrumentation and Controls components are identified in the summary tables and Section 3.6.2.1.

A description of these AMPs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation.

Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the Electrical and Instrumentation and Controls components will be adequately managed so that there is reasonable assurance that the intended function(s) will be maintained consistent with the Current Licensing Basis during the period of extended operation.

Table 3.6.1 Summary of Aging Management Evaluations in Chapter VI of NUREG-1801 for Electrical Components

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.6.1-01	Electrical equipment subject to 10 CFR 50.49 environmental qualification (EQ) requirements	Degradation due to various aging mechanisms	Environmental qualification of electric components	Yes, TLAA	Consistent with NUREG-1801. Further evaluation is documented in Section 3.6.2.2.1.
3.6.1-02	Electrical cables, connections and fuse holders (insulation) not subject to 10 CFR 50.49 EQ requirements	Reduced insulation resistance and electrical failure due to various physical, thermal, radiolytic, photolytic, and chemical mechanisms	Electrical cables and connections not subject to 10 CFR 50.49 EQ requirements	No	Consistent with NUREG-1801. In Table 3.6.2-1, reduced insulation resistance and electrical failure is considered equivalent to the aging effect listed for this item.
3.6.1-03	Conductor insulation for electrical cables and connections used in instrumentation circuits not subject to 10 CFR 50.49 EQ requirements that are sensitive to reduction in conductor insulation resistance (IR)	Reduced insulation resistance and electrical failure due to various physical, thermal, radiolytic, photolytic, and chemical mechanisms	Electrical Cables And Connections Used In Instrumentation Circuits Not Subject To 10 CFR 50.49 EQ Requirements	No	Consistent with NUREG-1801. In Table 3.6.2-1, reduced insulation resistance and electrical failure is considered equivalent to the aging effect listed for this item.
3.6.1-04	Conductor insulation for inaccessible medium voltage (2kV to 35kV) cables (e.g., installed in conduit or direct buried) not subject to 10 CFR 50.49 EQ requirements	Localized damage and breakdown of insulation leading to electrical failure due to moisture intrusion, water trees	Inaccessible medium voltage cables not subject to 10 CFR 50.49 EQ requirements	No	Consistent with NUREG-1801. In Table 3.6.2-1, reduced insulation resistance (formation of water trees) and electrical failure is considered equivalent to the aging effect listed for this item (localized damage and breakdown of insulation).
3.6.1-05	Connector contacts for electrical connectors exposed to borated water leakage	Corrosion of connector contact surfaces caused by intrusion of borated water	Boric Acid Corrosion	No	Consistent with NUREG-1801. In Table 3.6.2-1, electrical failure is the aging effect resulting from corrosion of connector contact surfaces.

Table 3.6.1 Summary of Aging Management Evaluations in Chapter VI of NUREG-1801 for Electrical Components

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.6.1-06	Fuse Holders (Not Part of a Larger Assembly): Fuse holders - metallic clamp	Fatigue due to ohmic heating, thermal cycling, electrical transients, frequent manipulation, vibration, chemical contamination, corrosion, and oxidation	Fuse Holders	No	Consistent with NUREG-1801. In Table 3.6.2-1, electrical failure is the aging effect resulting from adverse localized environments (causing corrosion and/or fatigue) of the metallic parts.
3.6.1-07	Metal enclosed bus - Bus/connections	Loosening of bolted connections due to thermal cycling and ohmic heating	Metal Enclosed Bus	No	Consistent with NUREG-1801. In Table 3.6.2-1, loosening of bolted connections is considered equivalent to the aging effect listed for this item.
3.6.1-08	Metal enclosed bus - Insulation/insulators	Reduced insulation resistance and electrical failure due to various physical, thermal, radiolytic, photolytic, and chemical mechanisms	Metal Enclosed Bus	No	Consistent with NUREG-1801. In Table 3.6.2-1, reduced insulation resistance and electrical failure is considered equivalent to the aging effect listed for this item.
3.6.1-09	Metal enclosed bus - Enclosure assemblies	Loss of material due to general corrosion	Structures Monitoring Program	No	Consistent with NUREG-1801.
3.6.1-10	Metal enclosed bus - Enclosure assemblies	Hardening and loss of strength due to elastomers degradation	Structures Monitoring Program	No	Consistent with NUREG-1801.
3.6.1-11	High voltage insulators	Degradation of insulation quality due to presence of any salt deposits and surface contamination; Loss of material caused by mechanical wear due to wind blowing on transmission conductors	A plant-specific aging management program is to be evaluated.	Yes, plant specific	NUREG-1801 electrical insulation materials aging effects are not applicable to PINGP. The plant-specific AMP used to manage loss of material caused by mechanical wear due to wind blowing on transmission high voltage insulator steel swivels is the Structures Monitoring Program. Further evaluation is documented in Section 3.6.2.2.2.

Table 3.6.1 Summary of Aging Management Evaluations in Chapter VI of NUREG-1801 for Electrical Components

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.6.1-12	Transmission conductors and connections; switchyard bus and connections	Loss of material due to wind induced abrasion and fatigue; loss of conductor strength due to corrosion; increased resistance of connection due to oxidation or loss of preload	A plant-specific aging management program is to be evaluated.	Yes, plant specific	NUREG-1801 aging effects are not applicable to PINGP. Further evaluation is documented in Section 3.6.2.2.3.
3.6.1-13	Cable Connections - Metallic parts	Loosening of bolted connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation	Electrical cable connections not subject to 10 CFR 50.49 environmental qualification requirements	No	Consistent with NUREG-1801, with exception. In Table 3.6.2-1, loosening of bolted connections is considered equivalent to the aging effect listed for this item.
3.6.1-14	Fuse Holders (Not Part of a Larger Assembly) Insulation material	None	None	NA - No AEM or AMP	Consistent with NUREG-1801.

Table 3.6.2-1 Electrical Components - Electrical Commodity Groups - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Electrical Cables and Connections Subject to 10 CFR 50.49 Environmental Qualification (EQ) Requirements	Electrical Continuity	Various organic polymers	Air/Gas	Reduced insulation resistance and electrical failure.	Environmental Qualification (EQ) of Electrical Components Program	VI.B.1a	3.6.1-01	A
Cable Connections (Metallic Parts)	Electrical Continuity	Various metals	Atmosphere / Weather Air/Gas	Loose connections and electrical failure.	Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program	VI.A-1 (LP-12)	3.6.1-13	B
Cables and Connections (Insulation), includes splices, terminations, fuse blocks and connectors (includes staged equipment)	Electrical Continuity	Various organic polymers (Staged equipment has some metallic portions)	Adverse localized environment	Reduced insulation resistance and electrical failure.	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program	VI.A.-2 (L-01) VI.A-6 (LP-03) VI.A-7 (LP-02) (Fuse Blocks)	3.6.1-02 3.6.1-14 (Fuse Blocks)	A, J
Electrical Penetrations (Electrical insulation portions)	Electrical Continuity	Various organic polymers	Adverse localized environment	Reduced insulation resistance and electrical failure.	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program	VI.A.2 (L-01)	3.6.1-02	A
Electrical Connector Contacts (metallic connector pins exposed to borated water)	Electrical Continuity	Various metals (Connector pins)	Borated water leakage	Electrical failure.	Boric Acid Corrosion Program	VI.A-5 (L-04)	3.6.1-05	A

Table 3.6.2-1 Electrical Components - Electrical Commodity Groups - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Cables and Connections Used in Instrumentation Circuits (Insulation), sensitive to reduction in conductor insulation resistance	Electrical Continuity	Various organic polymers	Adverse localized environment	Reduced insulation resistance and electrical failure.	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program	VI.A.-3 (L-02)	3.6.1-03	A
Fuse Holders (metallic parts), not part of a larger active assembly	Electrical Continuity	Copper alloys and other metals	Adverse localized environment Mechanical Cycling	Increased contact resistance (from corrosion and/or fatigue) Electrical failure.	Fuse Holders Program	VI.A-8 (LP-01)	3.6.1-06	A
Metal Enclosed Bus and Connections (Bus /Connections)	Electrical Continuity	Copper and aluminum	Atmosphere / Weather Air/Gas	Loose Connections (localized heating)	Metal-Enclosed Bus Program	VI.A-11 (LP-04)	3.6.1-07	A
Metal Enclosed Bus and Connections (Enclosure Assemblies - seals)	Expansion / separation	Elastomers (enclosure seals)	Atmosphere / Weather Air/Gas	Hardening and loss of strength / elastomer degradation	Structures Monitoring Program	VI.A-12 (LP-10)	3.6.1-10	A
Metal Enclosed Bus and Connections (Enclosure Assemblies)	Shelter protection	Steel	Atmosphere / Weather Air/Gas	Loss of material/corrosion	Structures Monitoring Program	VI.A-13 (LP-06)	3.6.1-09	A

Table 3.6.2-1 Electrical Components - Electrical Commodity Groups - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG -1801 Volume 2 Line Item	Table 1 Item	Notes
Metal Enclosed Bus and Connections (Insulation / Insulators)	Insulate (Electrical)	Various organic polymers and porcelain	Atmosphere / Weather Air/Gas	Reduced insulation resistance and electrical failure.	Metal-Enclosed Bus Program	VI.A-14 (LP-05)	3.6.1-08	A
Transmission conductors and connections	Electrical Continuity	Aluminum and Steel	Atmosphere / Weather	None	None	V1.A-16 (LP-08)	3.6.1-12	I, 1
Switchyard bus and connections	Electrical Continuity	Aluminum, Aluminum Alloy (Bolting)	Atmosphere / Weather	None	None	V1.A-15 (LP-09)	3.6.1-12	I, 3
Inaccessible Medium Voltage Cables and Connections (Insulation), underground, buried	Electrical Continuity	Various organic polymers	Moisture and voltage stress	Reduced insulation resistance (formation of water trees) and electrical failure.	Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program	VI.A-4 (LP-03)	3.6.1-04	A
High-voltage insulators	Insulate (Electrical)	Porcelain Cement	Atmosphere / Weather	None	None	VI.A-9 (LP-07)	3.6.1-11	I, 2
High-voltage insulators	Structural support	Metal	Atmosphere / Weather	Loss of material/mechanical wear due to wind blowing on transmission conductors	Structures Monitoring Program	VI.A-10 (LP-011)	3.6.1-11	E, 2

Notes for Table 3.6.2-1

A Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

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

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

D Component is different, but consistent with NUREG-1801 for material, environment, and aging effect. AMP takes 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 for this component.

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

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

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

J Neither the component nor the material and environment combination are evaluated in NUREG-1801.

Plant-specific notes:

1 Loss of conductor strength due to corrosion is accounted for by providing sufficient design margin to incur at least 30% loss of strength of ACSR transmission conductors in 80-year old specimens. Transmission conductor vibration would be caused by wind loading. Wind loading is accounted for in the initial design and field installation of transmission conductors and high-voltage insulators. No aging management activities are required for this commodity group. See Section 3.6.2.2.3.

2 Surface contamination is not an applicable aging mechanism. The buildup of surface contamination is not prevalent at PINGP as an aging mechanism. Cracking is not an applicable aging mechanism. Cracking or breaking of porcelain insulators is caused by physical damage (event driven) rather than as the result of an aging mechanism. No aging management activities are required for this commodity group (electrical insulation portion). Structural sections address the structural function and aging management of the steel swivels. See Section 3.6.2.2.2.

3 Connection surface oxidation is not an applicable aging effect. Vibration is not an applicable aging mechanism since the switchyard bus has no connections to moving or vibrating equipment. No aging management is required for this commodity group. See Section 3.6.2.2.3.

4.0 TIME-LIMITED AGING ANALYSES

Two areas of plant technical assessment are required to support an application for a renewed operating license. The first area of technical review is the Integrated Plant Assessment (IPA), which is described in Sections 2.0 and 3.0 of this LRA. The second area of technical review required is the identification and evaluation of plant-specific TLAAs and exemptions. The analyses identified and evaluated in this section meet the requirements contained in 10 CFR 54.21(c) and provide the information necessary for the NRC to make the finding contained in 10 CFR 54.29(a)(2).

4.1 Identification of Time-Limited Aging Analyses

Title 10 of the Code of Federal Regulations, Part 54 (10 CFR 54) sets forth the requirements for License Renewal of operating nuclear power plants. 10 CFR 54.21(c)(1) requires a listing and an evaluation of TLAAs. 10 CFR 54.21(c)(2) requires a listing and evaluation of active plant-specific exemptions granted under 10 CFR 50.12 that are based on TLAAs as defined in 10 CFR 54.3(a). The overall TLAA methodology is provided in Figure 4.1-1.

4.1.1 Identification Process of Time-Limited Aging Analyses

This section documents the identification and disposition of TLAAs, including TLAA-related exemptions granted pursuant to 10 CFR 50.12, which are applicable to PINGP and are in effect for the period of extended operation. TLAAs are defined in 10 CFR 54.3(a) as those licensee calculations and analyses that:

1. Involve systems, structures, and components within the scope of License Renewal, as delineated in 10 CFR 54.4(a);
2. Consider the effects of aging;
3. Involve time-limited assumptions defined by the current operating term, for example, 40 years;
4. Were determined to be relevant by the licensee in making a safety determination;
5. Involve conclusions or provide the basis for conclusions related to the capability of the system, structure, and component to perform its intended functions, as delineated in 10 CFR 54.4(b); and
6. Are contained or incorporated by reference in the Current Licensing Basis.

Potential TLAAs, which could meet these six criteria, can be identified in two ways:

- Reviewing lists of previously identified TLAAs and choosing those generically applicable to PINGP for further evaluation.
- Searching the PINGP CLB for calculations/analyses with a time element.

4.1.1.1 Industry Related Document Search

Industry License Renewal related documents, including previous applications by other plants, have already identified a number of TLAAs. These TLAAs tend to be generically applicable to other similar plants (e.g., PWR plants). These documents were searched to identify a list of known TLAAs, which could be potentially applicable to PINGP.

Methodology

The following documents were searched for typical TLAAs that could potentially be applicable to PINGP:

- NUREG-1800, Standard Review Plan for License Renewal, Revision 1, Chapter 4
- NUREG-1801, Generic Aging Lessons Learned (GALL) Report, Revision 1
- NEI 95-10, Industry Guidelines for Implementing the Requirements of 10 CFR 54 - The License Renewal Rule, Revision 6
- Statements of Consideration for 10 CFR 54
- WOG Generic Technical Reports
- Previously submitted License Renewal Applications for Westinghouse-designed PWR plants

Industry Results

The TLAAs listed below were identified as potentially applicable to PINGP:

1. Metal Fatigue Analysis
2. Reactor Vessel Neutron Embrittlement
3. Environmental Qualification
4. Metal Corrosion Allowance
5. In-service Flaw Growth Analysis
6. In-service Containment Corrosion Analysis
7. HELB Fatigue
8. Underclad Cracking
9. LTOP Analyses
10. Fatigue analysis of main steam supply line to turbine driven AFW pump
11. RCP Flywheel Fatigue Analysis

12. Polar Crane Fatigue Analysis
13. Reactor Vessel Internals Analyses
14. Leak Before Break Analysis
15. Containment Liner Plate, Metal Containments, & Penetrations Fatigue Analysis
16. Containment Penetration Pressurization Cycles
17. Turbine Rotor Evaluations

4.1.1.2 Current Licensing Basis (CLB) Document Search

The CLB documents were searched to determine if any potential TLAAs not previously identified by the industry search may exist for PINGP.

Methodology

The following documents were searched electronically for typical keywords which are indicative of a discussion of a TLAA:

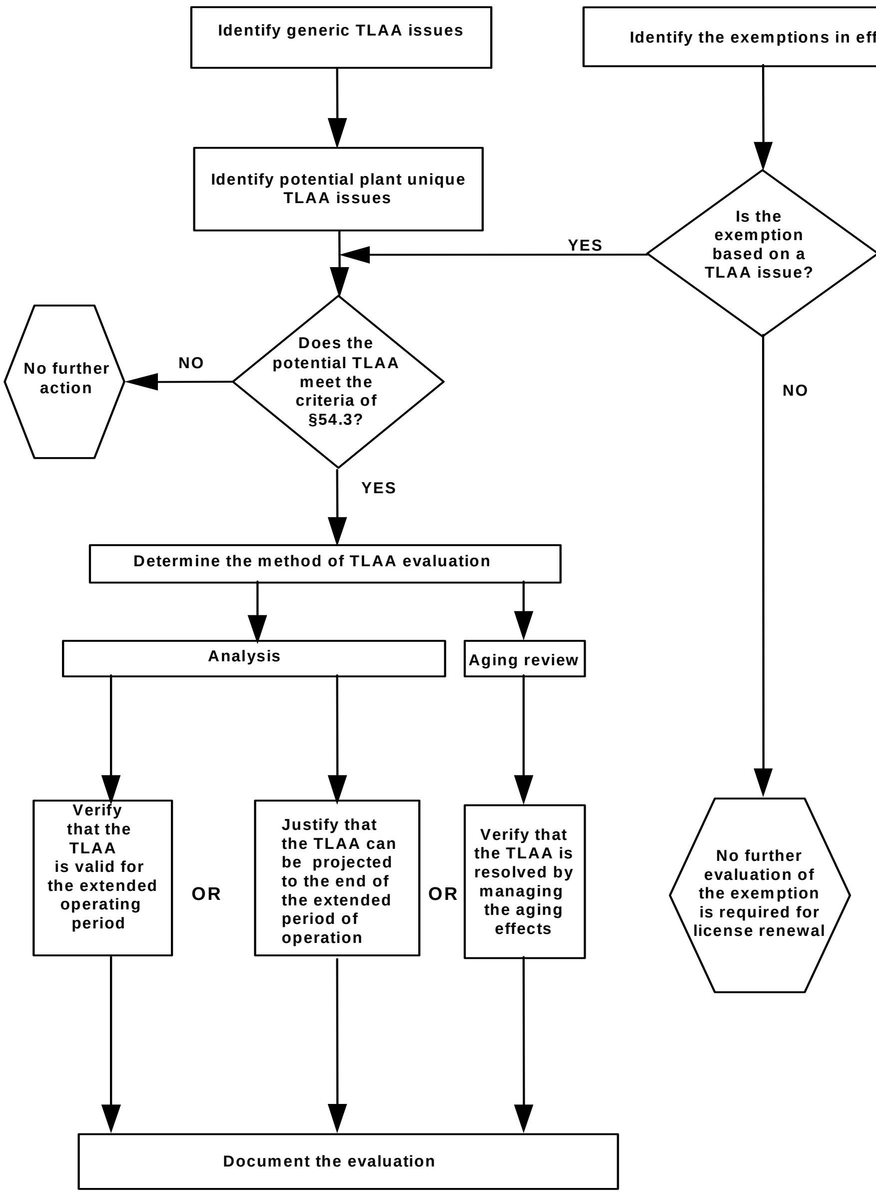
- USAR
- Technical Specifications
- NRC Safety Evaluation Reports (SERs)
- Docketed Correspondence
- NRC Regulatory Commitments and Requirements

In addition, Aging Management Review evaluations included a consideration for identifying the existence of potential TLAAs. Each document identified via the above search activities as containing a potential TLAA was reviewed to determine if it was, in fact, a TLAA for PINGP. The plant-specific TLAAs were then compared to those potential TLAAs identified through the industry related search.

Plant-Specific Results

The potential TLAAs identified through the PINGP-specific electronic CLB document searches and the aging management review evaluations were previously identified as potential TLAAs through the industry related search. These plant-specific searches did not reveal any new potential TLAAs for PINGP.

Figure 4.1-1 TLAA Methodology



4.1.2 Identification of Exemptions

10 CFR 54.21(c)(2) also requires that the application for a renewed license include a list of current plant-specific exemptions granted pursuant to 10 CFR 50.12 that are in effect and based on TLAAs as defined in 10 CFR 54.3. A review of the PINGP docket has been performed and the results of this review identified one 10 CFR 50.12 exemption, based on a TLAA as defined in 10 CFR 54.3.

The TLAA-related exemption that was identified is an exemption to the ASME Code, Section XI, Appendix G, relative to the use of Code Case N-514 for determining the overpressure protection system pressure setpoint. No additional exemptions based on TLAAs were identified.

As discussed in Section 4.2.4, updates of the overpressure protection system pressure setpoint and pressure-temperature evaluations will be managed in accordance with 10 CFR 54.21(c)(1)(iii) to include 60 years for both Units. Nuclear Code Case N-514 has been incorporated into ASME Section XI, Appendix G, and this exemption will not be required for the period of extended operation when the Pressure-Temperature limits are updated.

4.1.3 Evaluation Process of Time-Limited Aging Analyses

Each potential TLAA identified in Section 4.1.1 was screened against the six criteria of 10 CFR 54.3(a). Once a TLAA was identified as applicable to PINGP, an evaluation was performed, as required by 10 CFR 54.21(c)(1), to demonstrate that at least one of the following criteria was applicable:

i. The analyses remain valid for the period of extended operation;
ii. The analyses have been projected to the end of the period of extended operation; or
iii. The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

The results of these evaluations are provided in Table 4.1-1 and are discussed in Section 4.2 through Section 4.7. Table 4.1-2 contains a list of generic and plant-specific TLAAs from NUREG-1800 and their applicability to PINGP.

Table 4.1-1 Time-Limited Aging Analyses

TLAA Category	TLAA Description	Section	Disposition per 10 CFR 54.21(c)(1)
Reactor Vessel Neutron Embrittlement Section 4.2	Reactor Vessel Fluence	4.2.1	Analyses projected to the end of the period of extended operation 10 CFR 54.21(c)(1)(ii)
	Charpy Upper-Shelf Energy	4.2.2	Analyses projected to the end of the period of extended operation 10 CFR 54.21(c)(1)(ii)
	Pressurized Thermal Shock	4.2.3	Analyses projected to the end of the period of extended operation 10 CFR 54.21(c)(1)(ii)
	Pressure - Temperature Limits	4.2.4	Effects of aging will be adequately managed for the period of extended operation 10 CFR 54.21(c)(1)(iii)
Metal Fatigue Section 4.3	Class 1 Fatigue	4.3.1	Analyses remain valid, have been projected, and/or effects of aging will be adequately managed for the period of extended operation 10 CFR 54.21(c)(1)(i), (ii), and (iii)
	Non-Class 1 Fatigue	4.3.2	Analyses remain valid and/or effects of aging will be adequately managed for the period of extended operation 10 CFR 54.21(c)(1)(i) and (iii)
	Environmentally-Assisted Fatigue (GSI-190)	4.3.3	Analyses have been projected and/or effects of aging will be adequately managed for the period of extended operation 10 CFR 54.21(c)(1)(ii), and (iii)
Environmental Qualification Section 4.4	Environmental Qualification of Electrical Components	4.4.1	Effects of aging will be adequately managed for the period of extended operation 10 CFR 54.21(c)(1)(iii)
Concrete Containment Tendon Prestress Section 4.5	Concrete Containment Tendon Prestress	4.5	Not Applicable

Table 4.1-1 Time-Limited Aging Analyses

TLAA Category	TLAA Description	Section	Disposition per 10 CFR 54.21(c)(1)
Containment and Penetration Fatigue Analyses Section 4.6	Reactor Containment Vessel Fatigue	4.6.1	Analyses remain valid for the period of extended operation 10 CFR 54.21(c)(1)(i)
	Containment Penetration Fatigue	4.6.2	Analyses remain valid for the period of extended operation 10 CFR 54.21(c)(1)(i)
Other Plant-Specific Time-Limited Aging Analyses Section 4.7	RCS Piping Leak-Before-Break Analyses	4.7.1	Analyses remain valid and effects of aging are adequately managed for the period of extended operation 10 CFR 54.21(c)(1)(i) and (iii)
	Reactor Vessel Underclad Cracking	4.7.2	Analyses remain valid and effects of aging are adequately managed for the period of extended operation 10 CFR 54.21(c)(1)(i) and (iii)
	Reactor Coolant Pump Flywheel	4.7.3	Analyses remain valid for the period of extended operation 10 CFR 54.21(c)(1)(i)
	Fatigue Analysis of Cranes	4.7.4	Analyses remain valid for the period of extended operation 10 CFR 54.21(c)(1)(i)
	Probability of Damage to Safeguards Equipment from Turbine Missiles	4.7.5	Analyses remain valid for the period of extended operation 10 CFR 54.21(c)(1)(i)

Table 4.1-2 Review of Generic TLAAs Listed in Tables 4.1-2 and 4.1-3 of NUREG-1800

NUREG-1800 Generic TLAA Examples	Applicability to PINGP	LRA Section
NUREG-1800, Table 4.1-2 - Potential Time-Limited Aging Analyses		
Reactor vessel neutron embrittlement	Yes	4.2
Concrete containment tendon prestress	No - No prestressing system is employed in the PINGP containment design	4.5
Metal fatigue	Yes	4.3
Environmental qualification of electrical equipment	Yes	4.4
Metal corrosion allowance	No - Did not meet TLAA criteria	-
Inservice flaw growth analyses that demonstrate structural stability for 40 years	Yes - Crack growth analysis of Unit 2 SG feedwater nozzles	4.3.1.4
Inservice local metal containment corrosion analyses	No - Did not meet TLAA criteria	-
High-energy line-break postulation based on fatigue cumulative usage factor	No - PINGP Class 1 piping is designed in accordance with B31.1.0	-
NUREG-1800, Table 4.1-3 - Additional Examples of Plant-Specific TLAAs as Identified by the Initial License Renewal Applicants		
Intergranular separation in the heat-affected zone (HAZ) of reactor vessel low-alloy steel under austenitic SS cladding	Yes	4.7.2
Low-temperature overpressure protection (LTOP) analyses	Yes	4.2.4
Fatigue analysis for the main steam supply lines to the turbine-driven auxiliary feedwater pumps	Yes - Piping is designed in accordance with B31.1.0	4.3.2
Fatigue analysis of the reactor coolant pump flywheel	Yes	4.7.3
Fatigue analysis of polar crane	Yes - NUREG-0612 analysis of cranes	4.7.4
Flow-induced vibration endurance limit for the reactor vessel internals	No - Did not meet TLAA criteria	-

Table 4.1-2 Review of Generic TLAAs Listed in Tables 4.1-2 and 4.1-3 of NUREG-1800

NUREG-1800 Generic TLAA Examples	Applicability to PINGP	LRA Section
Transient cycle count assumptions for the reactor vessel internals	Yes - For replacement upper internals and MUR-PU assessment of baffle bolts	4.3.1.2
Ductility reduction of fracture toughness for the reactor vessel internals	No - Did not meet TLAA criteria	-
Leak before break	Yes	4.7.1
Fatigue analysis for the containment liner plate	No - PINGP has a metal containment vessel. Exemption from fatigue addressed in Section 4.6.1 of the LRA	-
Containment penetration pressurization cycles	No - Did not meet TLAA criteria. See Table 4.1-1, Containment Penetration Fatigue	-
Reactor vessel circumferential weld inspection relief (BWR)	No - Only applicable to BWRs	-

4.2 Reactor Vessel Neutron Embrittlement

The regulations governing reactor vessel integrity are in 10 CFR 50.

- Section 50.60 requires that all light-water reactors meet the fracture toughness, pressure-temperature limits, and material surveillance program requirements for the reactor coolant boundary as set forth in Appendices G and H of 10 CFR 50.
- Section 50.61 contains fracture toughness requirements for protection against pressurized thermal shock.

PINGP analyses that address the effects of neutron irradiation embrittlement of the reactor vessels for the current term of operation are contained in Reference 1 through Reference 5. The analyses are TLAAs that evaluated reduction of fracture toughness of the PINGP Unit 1 and Unit 2 reactor vessels for 40 years. The analyses for the initial 40-year license have been updated to address the additional twenty years of operation (i.e., 60 years) for License Renewal.

Both 10 CFR 50.60 and 50.61 require end-of-life material properties to be calculated upon a request for a renewed operating license. For the current term of operation, end-of-life for PINGP is 40 years, and the reactor vessel embrittlement calculations for pressurized thermal shock, upper shelf energy, and P-T limits are based on fluence projections to 35 EFPY, which is 40 calendar years times an assumed plant lifetime capacity factor of 0.875.

At 60 years, 54 EFPY (capacity factor of 0.9 times 60 years) is assumed to be the number of effective full power years of operation at the end of the period of extended operation for purposes of projecting fluence and calculating reactor vessel embrittlement. Plant lifetime capacity factors for PINGP Units 1 and 2 through 2006 are 84.5% and 87%, respectively. Therefore, use of 0.90 provides a reasonably conservative approximation to estimate end-of-life EFPY at 60 years.

The reactor vessel neutron embrittlement TLAAs are projected to the end of the period of extended operation in accordance with 10 CFR 54.21 (c)(1)(ii) as summarized below. The PINGP Reactor Vessel Surveillance Program will ensure that the time-dependent parameters (e.g., fluence and capsule withdrawal) used in the TLAAs described below remain valid through the period of extended operation consistent with 10 CFR 54.21 (c)(1)(iii).

4.2.1 Reactor Vessel Fluence

The first step in addressing the TLAAs associated with neutron embrittlement is the projection of the neutron fluence experienced by critical vessel locations to the end of the period of extended operation. The fluence projections were based on historical operational data through Cycle 24 for Unit 1 and Cycle 23 for Unit 2 at the current power level of 1650 MWt. Both Units were also modeled to account for a planned Measurement Uncertainty

Recapture Power Uprate (MUR-PU) during Cycle 25 in September 2008. Fluence projections were extended to 60 years of operation (i.e., 54 EFPY) at the MUR-PU power level.

The results of the calculated peak fluence values at various azimuthal locations at the pressure vessel clad/base metal interface are presented in Table 4.2-1. The calculated fluence projections were determined using methods described in WCAP-14040-NP-A, Revision 4 (Reference 6), which are consistent with the requirements in Regulatory Guide 1.190, "Calculation and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence" (Reference 7). The methodology of WCAP-14040-NP-A, Revision 4 was approved for use by the NRC.

The peak fluence at the clad/base metal interface at 54 EFPY is 5.162E19 n/cm^2 for Unit 1 and 5.196E19 n/cm^2 for Unit 2. Vessel fluence at 54 EFPY was also calculated at regions above and below the active fuel height to determine if any additional materials need to be added to the PINGP beltline for 60 years. The beltline of the reactor vessel is defined in 10 CFR 50 Appendix G as the region of the reactor vessel (shell material including welds, heat affected zones, and plates or forgings) that directly surrounds the effective height of the active core and adjacent regions of the reactor vessel that are predicted to experience sufficient neutron radiation damage to be considered in the selection of the most limiting material with regard to radiation damage.

At 40 years, the PINGP beltline includes nozzle shell forging B, circumferential weld that connects nozzle shell forging B to intermediate shell forging C, intermediate shell forging C, circumferential weld that connects intermediate shell forging C to lower shell forging D, and lower shell forging D. Since the 54 EFPY fluence at the reactor vessel outlet nozzle to nozzle shell forging B weld (highest fluence of any nozzle attached to the reactor vessel) and lower shell forging D to lower head circumferential weld are less than 1.0E17 n/cm^2, these materials are not limiting and are not part of the beltline. Therefore, the PINGP beltline materials for 60 years are identical to beltline materials defined for 40-years. Expansion of the beltline to include additional materials for the period of extended operation is not necessary.

The reactor vessel neutron fluence analysis is projected through the period of extended operation in accordance with 10 CFR 54.21(c)(1)(ii).

Table 4.2-1 PINGP Units 1 and 2 Reactor Vessel Clad/Base Metal Fluence at 60 years

Item	Location	54 EFPY Fluence (n/cm^2)
1	Nozzle Weld - RV Outlet Nozzle to Nozzle Shell Forging B	<1E17
2	Nozzle Shell Forging B	1.770E19 (U1) 1.743E19 (U2)
3	Lower Shell Forging D	5.026E19 (U1) 5.112E19 (U2)
4	Intermediate Shell Forging C	5.162E19 (U1) 5.196E19 (U2)
5	Circumferential Weld-Intermediate Shell forging C to Lower Shell Forging D	4.969E19 (U1) 5.043E19 (U2)
6	Circumferential Weld - Nozzle Shell Forging B to Intermediate Shell Forging C	1.770E19 (U1) 1.743E19 (U2)
7	Circumferential Weld-Lower Shell Forging D to Lower Head	<1E17

4.2.2 Charpy Upper-Shelf Energy

Appendix G of 10 CFR 50 requires that reactor vessel beltline materials "... have Charpy upper-shelf energy … of no less than 75 ft-lb initially and must maintain Charpy upper-shelf energy throughout the life of the vessel of no less than 50 ft-lb…." Regulatory Guide 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," provides two methods for determining Charpy upper-shelf energy (C_VUSE). Position 1.2 applies for material that does not have surveillance data available and Position 2.2 applies for material that does have surveillance data. For Position 1.2, the percent drop in C_VUSE, for a stated copper content and neutron fluence, is determined by reference to Figure 2 of Regulatory Guide 1.99, Revision 2. This percentage drop is applied to the initial C_VUSE to obtain the adjusted C_VUSE. For Position 2.2, the percent drop in C_VUSE is determined by plotting the available data on Figure 2 and fitting the data with a line drawn parallel to the existing lines that upper bounds all the plotted points.

Fluence values at 54 EFPY are provided in Table 4.2-1. The ¼T fluence is determined by applying Equation (3) of Regulatory Guide 1.99 based on a vessel thickness of 6.692 inches. Upper-shelf energies for beltline forgings and welds at 54 EFPY for PINGP Units 1 and 2 are reported in Table 4.2-2 and Table 4.2-3 and are all above 50 ft-lb. The TLAA for upper-shelf energy (USE) is projected through the period of extended operation in accordance with 10 CFR 54.21(c)(1)(ii).

Table 4.2-2 PINGP Unit 1 USE at 54 EFPY

Beltline ID	Material Type	USE at 54 EFPY ft-lb	1/4T Fluence n/cm^2	Unirr. USE ft-lb	% drop in USE	Cu%
Nozzle Shell Forging B-21744/ 38384	A 508-3	76[1] [75][4]	1.1847E19	85 [84][3]	11 11	0.08
Lower Shell Forging D-21887/38530	A 508-3	101[1]	3.3639E19	134	25	0.07
Int. Shell Forging C-21918/38566	A 508-3	123[2]	3.4549E19	143	14	0.07
Circ Weld-Int. Shell Forging C to Lower Shell Forging D 1752	UM40, Flux UM89	75[2]	3.3258E19	78	3.7	0.13
Circ Weld-Nozzle Shell Forging B to Int. Shell Forging C 2269	UM40, Flux UM89	>61[1] [59][4]	1.1847E19	>87 [84][3]	30 30	0.15

1-Position (1.2) - No Surveillance Data
2-Position (2.2) - Surveillance Data
3-Unirradiated USE for nozzle shell forging B and Circ weld-nozzle shell forging B to Int. shell forging C was reported as 84 ft-lb in accordance with NSP letter to the NRC dated September 16, 1998, Supplemental Response for Generic Letter 92-01, Reactor Vessel Structural Integrity.
4-USE of 59 ft-lb for circ. weld 2269 equals 84*(1-.30) and USE of 75 ft-lb for nozzle shell forging B equals 84*(1-.11). See note 3 for basis for 84 ft-lb.

Table 4.2-3 PINGP Unit 2 USE at 54 EFPY

Beltline ID	Material Type	USE at 54 EFPY ft-lb	1/4T Fluence n/cm^2	Unirr. USE ft-lb	% drop in USE	Cu%
Nozzle Shell Forging B-22231/ 39088	A 508-3	68[1]	1.167E19	85	20	0.07
Lower Shell Forging D-22642	A 508-3	88.6[2]	3.4215E19	108	18	0.08
Int. Shell Forging C-22829	A 508-3	84[1]	3.4777E19	112	25	0.07
Circ Weld-Int. Shell Forging C to Lower Shell Forging D 2721	UM40, Flux UM89	91.7[2]	3.373E19	103	11	0.09
Circ. Weld-Nozzle Shell Forging B to Int. Shell Forging C 1752	UM40, Flux UM89	>60[1] [57][4]	1.167E19	>83 [78.5][3]	28 28	0.13

1-Position (1.2) - No Surveillance Data
2-Position (2.2) - Surveillance Data
3-Unirradiated USE for Circ weld-nozzle shell forging B to Int. shell forging C was reported as 78.5 ft-lb in accordance with NSP letter to the NRC dated September 16, 1998, Supplemental Response for Generic Letter 92-01, Reactor Vessel Structural Integrity. Position (1.2) conservatively used. Use of surveillance data for Unit 1 weld 1752 would reduce % drop from 28% to approximately 4%
4-USE of 57 ft-lb equals 78.5 ft-lb*(1-.28). See note 3 for bases for 78.5 ft-lb.

4.2.3 Pressurized Thermal Shock

10 CFR 50.61(b)(1) provides rules for the protection of pressurized water reactors against pressurized thermal shock. Licensees are required to assess the projected values of reference temperature whenever a significant change occurs in projected values of the reference temperature for pressurized thermal shock (RT_{PTS}), or upon request for a change in the expiration date for the facility operating license. For License Renewal, RT_{PTS} values are calculated for 54 effective full power years (EFPY).

10 CFR 50.61(c) provides two methods for determining RT_{PTS}: (Position 1.1) for material that does not have surveillance data available and (Position 2.1) for material that does have surveillance data. Positions 1.1 and 2.1 are described in Regulatory Guide 1.99, Revision 2. Adjusted reference temperatures are calculated for both Positions 1.1 and 2.1 by following the guidance in Regulatory Guide 1.99, Sections 1.1 and 2.1, respectively, using copper and nickel content of PINGP beltline materials and end-of-life best estimate fluence projections. Copper and nickel content of the beltline materials and chemistry factors for surveillance materials are reported in Table 4.2-4 and Table 4.2-5.

Fluence values at 54 EFPY for PINGP Units 1 and 2 were obtained using the method described in Section 4.2.1 and are reported in Table 4.2-1. The methodology used to calculate vessel fluence meets the uncertainty requirements of Regulatory Guide 1.190 (Reference 7). The peak fluence on the pressure vessel clad/base metal interface is 5.162E19 n/cm^2 for Unit 1 and 5.196E19 n/cm^2 for Unit 2.

10 CFR 50.61(b)(2) establishes screening criteria for RT_{PTS}: 270^{o}F for plates, forgings, and axial welds and 300^{o}F for circumferential welds. The values for RT_{PTS} at 54 EFPY for PINGP Units 1 and 2 are provided in Table 4.2-4 and Table 4.2-5. The projected RT_{PTS} values are all within the established screening criteria for 54 EFPY. The limiting beltline material for PINGP Unit 1 is the nozzle shell forging B to intermediate shell forging C circumferential weld 2269, with an EOL RT_{PTS} of 157^{o}F using Position 1.1. The limiting beltline material for PINGP Unit 2 is the nozzle shell forging B to intermediate shell forging C circumferential weld 1752, with an EOL RT_{PTS} of 136^{o}F using Position 2.1. Therefore, RT_{PTS} for PINGP Units 1 and 2 have been projected through the period of extended operation in accordance with 10 CFR 54.21(c)(1)(ii).

Table 4.2-4 PINGP Unit 1 RT_{PTS} at 54 EFPY

Beltline ID	Material Type	RT_{PTS} at 54 EFPY (^oF)	Neutron Fluence (n/cm^2)	CF (^oF)	$RT_{NDT(u)}$ (^oF)	ΔRT_{PTS} at EOL (^oF)	Margin (^oF)	Cu%	Ni%
Nozzle Shell Forging B-21744/38384	A 508-3	89[1]	1.77E19	51	-4	59.00	34	0.08	0.68
Lower Shell Forging D-21887/38530	A 508-3	92[1]	5.026E19	44	-4	61.75	34	0.07	0.66
Int. Shell Forging C-21918/38566	A 508-3	110[1] 125[2]	5.162E19	44 54.7	14	61.98 77.05	34	0.07	0.80
Circ Weld-Int. Shell Forging C to Lower Shell Forging D (1752)	UM40, Flux UM89	141[1] 156[2]	4.969E19	69.7 80.8	-13	97.66 113.21	56	0.13	0.13
Circ. Weld-Nozzle Shell Forging B to Int. Shell Forging C (2269)	UM40, Flux UM89	157[1]	1.77E19	79.5	0	91.97	65.5	0.15	0.15

1-Position (1.1) - No Surveillance Data

2-Position (2.1) - Surveillance Data

Table 4.2-5 PINGP Unit 2 RT_{PTS} at 54 EFPY

Beltline ID	Material Type	RT_{PTS} at 54 EFPY (^{o}F)	Neutron Fluence (n/cm^2)	CF (^{o}F)	$RT_{NDT(u)}$ (^{o}F)	ΔRT_{PTS} at EOL (^{o}F)	Margin (^{o}F)	Cu%	Ni%
Nozzle Shell Forging B-(22231/39088)	A 508-3	72[1]	1.743E19	44	-13	50.72	34	0.07	0.73
Lower Shell Forging D-(22642)	A 508-3	102[1] 114[2]	5.112E19	51 59.6	-4	71.74 83.84	34	0.08	0.67
Int. Shell Forging C-(22829)	A 508-3	110[1]	5.196E19	44	14	62.03	34	0.07	0.75
Circ Weld-Int. Shell Forging C to Lower Shell forging D (2721)	UM40, Flux UM89	97[1] 110[2]	5.043E19	51.6 80.2	-31	72.45 112.6	56 28	0.09	0.11
Circ. Weld-Nozzle Shell Forging B to Int. Shell Forging C (1752)	UM40, Flux UM89	123[1] 136[2]	1.743E19	69.7 80.8	-13	80.35 93.14	56 56	0.13	0.13

1-Position (1.1) - No Surveillance Data

2-Position (2.1) - Surveillance Data

4.2.4 Pressure-Temperature Limits

Pressure-Temperature (P-T) Limit curves are used to satisfy the requirements of 10 CFR 50 Appendix G. 10 CFR 50 Appendix G requires reactor pressure vessel (RPV) thermal limit analyses to determine operating P-T limits for boltup, hydrotest, pressure tests, and normal operating and anticipated operational occurrences. P-T limits are developed for the RPV flange region and the core beltline region. Included in the core beltline P-T curve limits are the irradiation embrittlement effects.

The effects of embrittlement on the P-T curves are determined using the Adjusted Reference Temperature (ART) of the core beltline materials. RG 1.99, Revision 2 provides the methods for calculating ART. The value of ART is a function of RPV 1/4T fluence, 3/4T fluence, and beltline material chemistry.

The PINGP Pressure and Temperature Limit Report (Reference 5) contains P-T curves valid to 35 EFPY using the methods defined in ASME Boiler and Pressure Vessel Code, Section XI, Appendix G, 1992 Edition, as described in WCAP-14780, Revision 3 (Reference 10) for Unit 1 and WCAP-14637, Revision 3 (Reference 11) for Unit 2. The NRC safety evaluation of the PINGP 35 EFPY P-T limits is provided in an NRC letter dated April 29, 1998 (Reference 12).

The P-T limit curves will continue to be updated, as required by Appendix G of 10 CFR 50, or as operational needs dictate. This updating will assure that the operational limits remain valid through the period of extended operation. In addition, PINGP has estimated that there will be sufficient operating margin to conduct plant heatups and cooldowns at 60 years based on a comparison of 54 EFPY and 35 EFPY Adjusted Reference Temperatures (ARTs) for limiting beltline materials at the vessel clad/base metal interface. That is, a reduction in clad/base metal ARTs is predicted at 54 EFPY (Table 4.2-4 and Table 4.2-5) compared to 35 EFPY (RVID2 database) for the limiting nozzle shell to intermediate shell circumferential welds at both Units, and a minor increase (<5^{o}F) at 54 EFPY for the intermediate and lower shell forgings. The relatively small change in ARTs at 54 EFPY combined with the use of the current NRC-approved edition of ASME Section XI, Appendix G, provides assurance that PINGP will have sufficient margin to conduct heatups and cooldowns at 60 years.

Additional P-T limit analysis is not required at this time. The P-T limit curves will be updated, when required, in accordance with Appendix G of 10 CFR 50. Required updates of the P-T curves will be adequately managed for the period of extended operation, by the Reactor Vessel Surveillance Program, consistent with 10 CFR 54.21(c)(1)(iii).

Low-Temperature Overpressure Protection Analyses

Each time the P-T limit curves are revised, the Low-Temperature Overpressure Protection System (OPPS) limits must be re-evaluated to ensure its functional requirements continue to be met. PINGP has established an OPPS enable temperature using the NRC-approved methodology presented in WCAP-14040-NP-A, Revision 2 with the provision permitted by ASME Code Case N-514. Calculation of new low-temperature overpressure protection limits is considered part of the development of Pressure-Temperature limit curves. OPPS limits, therefore, are managed for the period of extended operation by the Reactor Vessel Surveillance Program consistent with 10 CFR 54.21(c)(1)(iii).

4.3 Metal Fatigue

Fatigue analyses are potential TLAAs for Class 1 and selected non-Class 1 mechanical components. Fatigue is an age-related degradation mechanism caused by cyclic stressing of a component by either mechanical or thermal stresses. Fatigue analyses are TLAAs if they meet all six elements of the definition in 10 CFR 54.3(a). If the analyses are based on a number of cycles estimated for the current license term, they may be considered to meet criterion 54.3(a)(3) of being based on the current operating term. Evaluation of the TLAA, per 10 CFR 54.21(c)(1), determines whether:

(i) The analyses remain valid for the period of extended operation,

(ii) The analyses have been projected to the end of the period of extend operation, or

(iii) The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

Class 1 and non-Class 1 components that are potentially susceptible to fatigue damage have been reviewed for TLAAs and evaluated where applicable. The metal fatigue TLAA evaluation results are presented for Class 1 components in Section 4.3.1 and non-Class 1 components in Section 4.3.2. For purposes of the fatigue evaluations reported herein, the PINGP Class 1 boundary includes the components within the ASME Section XI, Subsection IWB inspection boundary and the steam generator items designed to ASME Section III, Class A or Class 1.

The fatigue evaluations reported in this section are based on normal, upset, and test design transients defined in component design specifications and the USAR. Except as noted below, the existing design basis analyses, coupled with the identified aging management programs, were used to provide assurance that components will remain within their fatigue usage limits through the extended operating period. The design transients and analysis results were also reviewed to assess the impact of the planned MUR-PU power uprate discussed in LRA Section 2.1.1.5. This review concluded that the impact of the planned MUR-PU on fatigue usage would be very small, and implementation of the MUR-PU in itself would not result in any component reaching a fatigue limit (i.e., cumulative usage factor of 1.0) during the period of extended operation, or requiring aging management strategies beyond those already discussed in this section.

Fracture mechanics analyses of flaws discovered during in-service inspection may be TLAAs if those analyses are based on time-limited assumptions defined by the current operating term. When a flaw is detected during in-service inspections, either the flaw must be repaired or the component that contains the flaw can be evaluated for continued service in accordance with ASME Section XI. These evaluations may show that the component is acceptable to the end of the license term based on projected in-service flaw growth. Flaw growth is typically predicted based on the design thermal and mechanical loading cycles. Evaluations of flaw growth in accordance with ASME Section XI, where applicable, are discussed in Section 4.3.1.1 through Section 4.3.1.6.

4.3.1 Class 1 Fatigue

The PINGP reactor vessels, control rod drive mechanism housings, pressurizers, and steam generators are designed in accordance with ASME Section III, Class A or Class 1 (Table 4.1-11 of the USAR) and as such were analyzed for fatigue. For purposes of the fatigue evaluation reported herein, the PINGP Class 1 boundary includes components within the ASME Section XI, Subsection IWB inspection boundary and the steam generator items designed to ASME Section III, Class A or Class 1.

The fatigue evaluations are contained in analyses and stress reports. The fatigue evaluations calculate a cumulative usage factor (CUF) for each component or subassembly based on a specified number of design transient cycles for that component. Because the specified numbers of design transient cycles may be the number originally assumed for a 40-year license term, these fatigue evaluations are considered TLAAs. In accordance with ASME Section III, the cumulative usage factors must be less than 1.0.

Design cyclic loadings and thermal conditions for the Class 1 components are defined by the applicable design specifications for each component. The original design specifications established the initial set of transients that were used in the design of the components and are included as part of each component analysis and stress report. Design transient cycles for PINGP Class 1 components are listed in Section 4.1.4 and Table 4.1-8 of the PINGP USAR.

Cumulative Usage Factors

Fatigue evaluations are used to determine the cumulative usage factors (CUFs) for applicable PINGP Class 1 components, and were included in the original component design reports. The cumulative usage factors reported in Section 4.3.1, except as otherwise noted, are the design basis values and do not consider the effects of reactor water environment on fatigue life. The CUFs for Class 1 components are summarized in subsections below.

PINGP Design Cycles

To provide the necessary high degree of integrity for the NSSS components, the transient parameters selected for component stress analyses were based on conservative estimates of the magnitude and frequency of the temperature and pressure transients resulting from various plant operating conditions. The transients selected for use in component stress analyses were representative of operating conditions that could occur during plant operations and were considered to be sufficiently severe or frequent to be of possible significance to component stress analysis. The transients were selected to be conservative representations of transients that, when used as a basis for component stress analysis, would provide confidence that the component was appropriate for its application over the operating license period of the plant.

The set of design transients used for design of PINGP Units 1 and 2 Class 1 components was developed in the 1960s and the assumed numbers of occurrences of each transient were based on the expected number of cycles the plant would experience over a 40-year interval. The design transient parameters were reviewed to assure that any analyses based on those transients would be applicable to the 60-year renewed operating license term. The design transients for Units 1 and 2 are listed in Table 4.1-8 of the USAR and are repeated in Table 4.3-1

Design basis fatigue evaluations, the sources of the CUFs reported in this section, are based on the assumed numbers of design transient cycles. To ensure that cyclic fatigue limits will not be exceeded, it is necessary to track and evaluate cyclic fatigue inducing events. PINGP monitors the design transient cycles that contribute to fatigue usage in accordance with the Metal Fatigue of Reactor Coolant Pressure Boundary Program. As discussed further below, this program provides an acceptable means for ensuring that TLAAs associated with fatigue of Class 1 components will remain valid through the period of extended operation in accordance with 10 CFR 54.21(c)(1)(iii).

Cycle Projections to 60 Years

The design transient cycles accrued through September 30, 2006, have been determined for PINGP Units 1 and 2. The accumulated numbers of design transient cycles have been projected to determine the numbers of cycles expected at the end of 60 years of operation. The results are shown in Table 4.3-1.

The PINGP Metal Fatigue of Reactor Coolant Pressure Boundary Program tracks the accumulated numbers of design cycles of the design transients used in the stress analyses of the Class 1 components. The transients are divided into normal conditions, test conditions, abnormal (upset) conditions, pressurizer auxiliary spray actuations and other events. Since the designs of both Units assume the same transients and the same numbers of design cycles, the maximum number of cycles accrued through September 30, 2006, for either Unit 1 or Unit 2 is reported in Table 4.3-1. Units 1 and 2 had logged 33 and 32 years of operation, respectively, as of that date. To obtain the projection at 60 years, it was assumed that the data for the actual cycles was for 30 years of plant operation. Therefore, the 60-year cycle projections shown in Table 4.3-1 are twice the actual cycles accrued through September 30, 2006. A linear extrapolation is reasonable for 60-year projections since the cycle logging history indicates a higher frequency of design transient occurrences over the first 10-15 years of operation when compared to the most recent 10-15 years of operation. Aging management programs and the maintenance rule will ensure that both PINGP Units will continue to operate at the transient rates experienced over the most recent 10-15 years of operation. Therefore, extrapolation of design transients to 60 years by doubling the 30 year values is a reasonable means of projection that is expected to be bounding.

In all instances the number of design transient cycles projected to be accumulated at 60 years is less than the number of cycles used in the fatigue evaluations. Therefore, the original number of design transient cycles will remain valid through the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i). The PINGP Metal Fatigue of Reactor Coolant Pressure Boundary Program will continue to assure that the accumulated numbers and severity of transients experienced by PINGP remain within design limits in accordance 10 CFR 54.21(c)(1)(iii).

Table 4.3-1 PINGP Units 1 and 2 Design and Projected Number of Design Cycles

Transient Condition	Design Cycles	Actual Number of Occurrences through 9/30/2006 (Maximum of Units 1 or 2)[1]	60-year Projection[2]
Normal Conditions			
Plant heatup (100 ^{o}F/h)	200	63	126
Plant cooldown (100 ^{o}F/h) (Pressurizer 200 ^{o}F/h)	200	62	124
Plant loading at 5-percent of full power per min	18,300	432	864
Plant unloading at 5-percent of full power per min	18,300	485	970
Step load increase of 10-percent of full power (but not to exceed full power)	2000	38	76
Step load decrease of 10-percent of full power	2000	49	98
Large Step Load Decrease in Load	200	13	26
Steady state fluctuations	Infinite	Not Counted	Not Projected
Upset Conditions			
Loss of Load Without Immediate Turbine or Reactor Trip	80	2	4

Table 4.3-1 PINGP Units 1 and 2 Design and Projected Number of Design Cycles

Transient Condition	Design Cycles	Actual Number of Occurrences through 9/30/2006 (Maximum of Units 1 or 2)[1]	60-year Projection[2]
Loss of Offsite Power (LOOP with natural circulation in RCS)	40	5	10
Loss of Flow (partial loss of flow, one pump only)	80	4	8
Reactor Trip from Full Power	400	84	168
Test Conditions			
Turbine roll test	10	2	4
Primary Side Hydrostatic Test Before Initial Startup at 3107 psig	5[3]	2	4
Secondary Side Hydrostatic Test Before initial Startup at 1357 psig for Unit 1 and 1356 psig for Unit 2	5	2	4
Primary Side Leak test at 2330 psig for Unit 1 and 2500 psia for Unit 2	50	0	Not Projected
Faulted Conditions			
Reactor Coolant Pipe Break	1	0	0
Steam Pipe Break	1	0	0
Steam Generator Tube Rupture	(Included in the Reactor Trip from Full Power Transient)	1	2

1. Maximum number of occurrences for Unit 1 or Unit 2 is reported.
2. It is assumed that the data for the actual cycles are for 30 years of plant operation. Units 1 and 2 have logged 33 and 32 years of operation, respectively. The projected 60-year cycles are twice the actual cycles counted through September 30, 2006.
3. Unit 1 RSGs designed for 15 primary side hydrostatic tests.

4.3.1.1 Reactor Pressure Vessel and CRDM Housings

The reactor pressure vessel (and appurtenances) fatigue analyses for Units 1 and 2 were performed in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, 1968, and addenda including Winter 1968. The reactor vessel heads at Units 1 and 2 were replaced in 2006 and 2005, respectively; and the replacement reactor vessel head stress analyses were performed in accordance with the applicable requirement of ASME Section III, Division 1, Subsection NB, 1998 Edition through the 2000 Addenda. The fatigue analyses of the reactor vessel are considered TLAAs because they are based on numbers of design transient cycles expected to occur in 40 years of operation. The CUFs for the reactor pressure vessel are given in Table 4.3-2.

Design parameters for cyclic loadings and thermal conditions for the reactor pressure vessel were originally defined in the design specifications and analyzed in the original vessel stress reports. As described in Section 4.3.1, the projected 60-year numbers of transient cycles used for reactor vessel fatigue analyses remain within analyzed values. Consequently, the fatigue analyses based on those transients will remain valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i). The cumulative numbers of design transients experienced by the reactor vessels will continue to be managed by the Metal Fatigue of Reactor Coolant Pressure Boundary Program in accordance with 10 CFR 54.21(c)(1)(iii).

Table 4.3-2 Cumulative Usage Factors for the Units 1 and 2 Reactor Vessels

Reactor Vessel Location	CUF
RV Head Adapter Penetrations- Alloy 600 Nozzle, SS Adapter, and J Groove Weld	0.6120
Replacement Head flange	0.082
Vessel flange	0.02
Closure studs	0.889
Primary Nozzles	
-RV Inlet Nozzle	0.0165
-RV Outlet Nozzle	0.035
-Safety Injection Nozzle	0.15
Vessel Support	0.0003
Core support pad	0.0002
Bottom head to shell	0.001
Bottom instrument penetrations	0.08

Table 4.3-2 Cumulative Usage Factors for the Units 1 and 2 Reactor Vessels

Reactor Vessel Location	CUF
RV Head Vent Pipe	0.022

The PINGP control rod drive mechanisms for Units 1 and 2 were replaced in 2006 and 2005, respectively. The stress analyses for the replacement CRDMs were performed in accordance with the applicable requirements of ASME Section III, Division 1, Subsection NB, 1998 Edition through the 2000 Addenda. Cumulative usage factors for limiting CRDM housing locations are provided in Table 4.3-3.

Table 4.3-3 Cumulative Usage Factors for Units 1 and 2 CRDM Housings

CRDM Location	CUF
Upper Latch Housing-maximum	0.364
Lower Latch Housing-maximum	0.043
Rod Travel Housing	0.025

These usage factor calculations are considered TLAAs as they are based on design transients intended to represent 40 years of operation. As discussed in Section 4.3.1, the numbers of analyzed design transients used in this fatigue analysis will not be exceeded in 60 years of operation, and thus, this TLAA will remain valid through the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i). The cumulative numbers of design transients experienced by the CRDM housings will continue to be managed by the Metal Fatigue of Reactor Coolant Pressure Boundary Program in accordance with 10 CFR 54.21(c)(1)(iii).

4.3.1.2 Reactor Vessel Internals

The PINGP reactor vessel internals were originally designed prior to incorporation of specific design requirements for reactor vessel internals in ASME Section III. A plant-specific stress report on the original reactor internals was not required. In the mid 1980s the upper internals of Units 1 and 2 were replaced due to concerns relative to aging of split pins. The replacement upper internals were constructed in accordance with ASME Section III, Subsection NG, 1974 Edition through Summer 1976 Addenda. The fatigue analyses of the replacement upper internals are considered TLAAs because they are based on numbers of design cycles expected to occur in 40 years of operation. CUFs at selected locations on the replacement upper internals are reported in Table 4.3-4.

Table 4.3-4 CUFs for Units 1 and 2 Reactor Vessel Upper Internals

RVI Upper Support Structure Locations	CUF
Upper Support Plate Perforated Region-Rim	0.70
Upper Support Plate/Skirt Juncture	0.24
Skirt-Flange Juncture	0.04
Flange	0.13
Upper Core Plate-perforated section adjacent to alignment pin cutout	0.03
Upper Support Column Base Bolts-Shank	0.85
Fuel Pins	0.08
Guide Tube and Support Pin	
-Lower grid plate/ sheath weld	0.81
-Hold down bolts	0.606

Fatigue evaluations have also been performed for the RV lower internals, which is not included in the CLB. The fatigue analyses are based on the design transients listed in Table 4.3-1, and resulted in acceptable usage factors at all but one location. The analyses determined that the baffle bolts are the limiting items in the baffle plate assembly and are not capable of sustaining the full set of plant loading and unloading (at 5% per minute) design cycles listed in Table 4.3-1. Cumulative usage was calculated through Fuel Cycle 26 based on actual design transient accrual through September 2006. Usage after Cycle 26 was calculated based on a reduced number of design transient cycles of plant loading and unloading that would limit the total baffle bolt usage to less than 1.0. The total allowable number of plant loading and unloading at 5% per minute cycles is 1835 compared to the original design value of 18,300. As shown in Table 4.3-1, the relevant transients, plant loading and unloading at 5% per minute, are projected to occur 970 times over the 60-year operating period, well below the reduced cycle limit for the baffle bolts of 1835. With this reduced cyclic limit, this TLAA for the baffle bolts has been projected through the period of extended operation in accordance with 10 CFR 54.21(c)(1)(ii).

As discussed in LRA Section B3.2, the Metal Fatigue of Reactor Coolant Pressure Boundary Program and USAR Table 4.1-8 will be enhanced to include this additional cyclic limit for baffle bolt fatigue.

The CUFs for the remaining reactor vessel upper and lower internals items continue to be based on the same transients as the reactor vessel, and the numbers of those transients will not be exceeded in 60 years; therefore these TLAAs remain valid for the period of extended operation per 10 CFR 54.21(c)(1)(i). The cumulative numbers of applicable design transients experienced by the reactor vessel internals, including the baffle bolts, will continue to be managed by the Metal Fatigue of Reactor Coolant Pressure Boundary Program in accordance with 10 CFR 54.21(c)(1)(iii).

4.3.1.3 Pressurizers

The pressurizer (and appurtenances) fatigue analyses for Units 1 and 2 were performed in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, 1965 Edition and addenda including Summer of 1966 for Unit 1 and Winter 1966 for Unit 2. Unit 1 and Unit 2 pressurizers are cylindrical pressure vessels with cast upper and lower heads. Cumulative usage factors for the pressurizer are reported in Table 4.3-5.

Table 4.3-5 Cumulative Usage Factors for the Units 1 and 2 Pressurizers[1]

Location	CUF
Surge Nozzle	0.2646
Spray Nozzle-SS Safe End	0.848
Safety & Relief Nozzle (4-inch and 6-inch nozzles)	0.148
Lower Head	0.004
Upper Head-to-Shell	0.774
Support Skirt and Flange	0.0011
Manway Analysis	Below endurance limit
Instrument Nozzles (nozzles in lower and upper heads)	0.1084

1-Does not include effects of insurge/outsurge and thermal stratification.

These usage factor calculations are considered TLAAs as they are based on design transients intended to represent 40 years of operation. As discussed in Section 4.3.1, the numbers of analyzed design transients used in these fatigue analyses will not be exceeded in 60 years of operation and, thus, these TLAAs will remain valid through the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i). The cumulative numbers of design transients experienced by the pressurizers will continue to be managed by the PINGP Metal Fatigue of Reactor Coolant Pressure Boundary Program in accordance with 10 CFR 54.21(c)(1)(iii).

Insurge/Outsurge Transients

License Renewal applicants are expected to demonstrate that pressurizer components have been analyzed for cumulative fatigue usage through the period of extended operation, and that the analyses include insurge/outsurge and other transient loads not considered in the current licensing basis. The design cumulative usage factors for the lower head and the nozzles in the lower head reported in Table 4.3-5 do not consider the effects of insurge/outsurge transients and the potential for large thermal gradients in the lower head of the pressurizer.

Current plant operating practices mitigate insurge/outsurge effects in the pressurizer by the use of continuous spray during heatup and cooldown transients. A small flow is maintained from the pressurizer to the hot leg during these transients, resulting in a uniform fluid temperature below the pressurizer heaters and in the upper portion of the surge line to prevent thermal stratification. In addition, since 1991, plant heatup and cooldown procedures have adopted the Westinghouse Modified Operating Procedure (MOP) "Water Solid" method for heatups and cooldowns to reduce the magnitude of resulting insurge/outsurge temperature transients at the pressurizer. Prior to 1991, however, heatups and cooldowns used the "Standard Steam Bubble" method which would have resulted in larger temperature transients and higher fatigue usage.

PINGP will perform a fatigue evaluation of pressurizer and surge line locations affected by insurge/outsurge transients. This evaluation will determine the cumulative fatigue usage from past operation, accounting for the periods of both "Water Solid" and "Standard Steam Bubble" operating strategies, and will project the cumulative fatigue usage of selected locations for 60 years. Analysis results will be incorporated, as applicable, into the Metal Fatigue of Reactor Coolant Pressure Boundary Program. This analysis will be completed prior to the period of extended operation.

In addition, the Metal Fatigue of Reactor Coolant Pressure Boundary Program will be enhanced to include stress-based fatigue monitoring of the pressurizer heater penetration, pressurizer surge nozzle, surge line elbow, and hot leg surge nozzle to monitor the effects of insurge/outsurge transients. With this enhancement, the program will manage metal fatigue of the pressurizer due to insurge/outsurge transients in accordance with 10 CFR 54.21(c)(1)(iii).

4.3.1.4 Steam Generators

PINGP Unit 1 steam generators were replaced during an outage (1R23) completed in November 2004. PINGP Unit 2 continues to operate with the original steam generators. The steam generator fatigue analyses for Units 1 and 2 were performed in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III. The primary and secondary sides are Class 1 and were designed in accordance with ASME Section III, 1995 Edition through 1996 Addenda for Unit 1 and 1965 Edition through Winter 1966 Addenda for Unit 2. The fatigue analyses of the steam generators are considered TLAAs because they are based on numbers of design cycles expected to occur in 40 years of operation. Cumulative usage factors for SG locations are provided in Table 4.3-6.

Table 4.3-6 Cumulative Usage Factors for the Units 1 and 2 Steam Generators

Steam Generator Location	**CUF**	
Primary Side Pressure Boundary Items	Unit 1	Unit 2
Divider Plate	0.286	0.7906
Tube/Tubesheet Weld	0.004	0.063
Tubes	0.0	0.0402
Primary Nozzle-Inlet	0.007	0.880
Primary Nozzle-Outlet	0.006	0.880
Secondary Side Pressure Boundary Items		
Main Feedwater Nozzle	0.713	0.9165

These usage factor calculations are based on the design transients discussed in Section 4.3.1 and will remain valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i). The cumulative numbers of design transients experienced by the steam generators will continue to be managed by the Metal Fatigue of Reactor Coolant Pressure Boundary Program in accordance with 10 CFR 54.21(c)(1)(iii).

Fatigue and Fracture Mechanics Evaluation of Feedwater Inlet Nozzle

In October 1992, NMC replaced the feedwater pipe spool pieces on all four steam generators (Units 1 and 2). The spool piece connects the main feedwater piping to the main feedwater nozzle. The original spool piece contained the auxiliary feedwater pipe branch connection that entered the spool piece at a 90 degree angle to the feedwater flow. Concerns regarding potential thermal fatigue of the weld that connected the spool piece to the feedwater nozzle led NMC to replace the spool piece and inspect the feedwater nozzle and attached thermal sleeve.

Each spool piece, the weld that connected the spool piece to the feedwater nozzle, and part of the original feedwater nozzle were removed. Examinations of the removed items revealed minor cracking at the weld and in the base metal both upstream (piping side) and downstream (nozzle side) from the weld. The maximum crack depth was 0.074 inches in piping upstream of the spool piece to nozzle weld on Steam Generator 12. It was noted that the observed cracking was associated primarily with repair welding performed during construction. All metal (piping, weld, and nozzle base metal) that contained cracks on each steam generator was removed as part of the repair.

Examination of the feedwater nozzle thermal sleeve revealed erosion at the OD (maximum of approximately 0.128 inches for SG 21) and ID (minor). Although the thermal sleeve does not support the pressure boundary, the reduction in OD provides for increased bypass flow between the thermal sleeve and the nozzle bore, which may subject the ID radius (i.e., knuckle region) of the nozzle to higher thermal stresses. Each feedwater nozzle bore and knuckle region was subsequently inspected with no reported indications of degradation or cracking.

Detailed thermal hydraulic, fatigue, and fracture mechanics evaluations were performed to justify leaving the thermal sleeves in the as-found condition. Fatigue usage factors were calculated at locations in the nozzle bore and knuckle regions where fatigue crack growth evaluations were performed and found to be significantly less than the allowable value of 1.0. A fracture mechanics evaluation was performed at high stress locations in the nozzle bore and knuckle regions to assess the integrity of the nozzles with postulated cracks. Inspections of these locations verified no pre-existing cracks and the fatigue evaluations predicted low usage factors.

The crack growth analysis was in accordance with ASME Section XI and included postulating an initial flaw and predicting growth of the flaw due to an imposed series of loading transients. Initial flaw depths of 0.10 inches and 0.20 inches were postulated at each location. The analysis predicted that the postulated flaws would double in size over four years of loading cycles, which corresponds to approximately 100 days of mode 2/3 operation. Critical flaw depth at these locations was shown to exceed 1.8 inches, far in excess of the predicted crack growth for one hundred days of mode 2/3 operation. PINGP monitors Mode 2/3 operation for the FW nozzles in accordance with the Metal Fatigue of Reactor Coolant Pressure Boundary Program to ensure that the bounds of the facture mechanics evaluation are not exceeded. The restrictions do not apply to Unit 1 since the steam generators were replaced in 2004.

The crack growth analysis of the Unit 2 feedwater nozzles is a TLAA since the assumption of 100 days of loading over 4 years has been extended to the remaining life of the Unit 2 SGs. To assure that the assumptions supporting the crack growth analysis continue to be met, loading cycles at the affected locations during Mode 2/3 operation are managed by the Metal Fatigue of Reactor Coolant Pressure Boundary Program in accordance with 10 CFR 54.21(c)(1)(iii).

SG Tube Fatigue for Units 1 and 2

PINGP steam generator tubing has been evaluated for susceptibility to fatigue-induced cracking of the type experienced at North Anna Unit 1 on July 15, 1987. The fatigue analysis utilizes operating conditions specific to Prairie Island to account for the plant-specific nature of tube loading and response. For both Unit 1 and Unit 2, the results indicate that all tubes have acceptable fatigue usage and no corrective actions are required. A cumulative usage factor of 0.173 was calculated for the operating license period of 40-years and is a TLAA. This evaluation no longer applies to Unit 1 since the steam generators were replaced in 2004. The replacement steam generators for Unit 1 contain stainless steel tube support plates and are not susceptible to denting experienced by North Anna Unit 1, as described in NRC Bulletin 88-02.

The U-bend fatigue of the Unit 2 steam generators was recalculated to account for operation at MUR-PU power levels and License Renewal. The U-bend fatigue usage factor has been revised to 0.378 and is applicable to the period of extended operation. Therefore, steam generator tube fatigue usage for Unit 2 has been shown to be acceptable when projected to the end of the period of extended operation in accordance with 10 CFR 54.21(c)(1)(ii).

4.3.1.5 Reactor Coolant Pumps

The reactor coolant pumps (RCPs) were designed in accordance with Article 4 of ASME Section III through the 1970 Winter Addendum. The fatigue analyses of the RCPs are considered TLAAs because they are based on the numbers of design cycles expected to occur in 40 years of operation. A summary of cumulative usage factors for the RCPs is provided in Table 4.3-7.

Cumulative usage factors were determined for the top end of the casing, inside radius of the main flange, main flange bolts, thermal barrier flange, and water connection pipe. Exemption from fatigue evaluation was justified for the casing feet, casing nozzle, and upper and lower seal housings and bolts. These usage factor calculations and exemption from fatigue evaluations are considered TLAAs as they are based on design transients (Table 4.3-1) intended to represent 40 years of operation. The numbers of analyzed design transients used in the RCP fatigue analyses will not be exceeded in 60 years of operation and these TLAAs will remain valid through the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i). The cumulative numbers of design transients experienced by the reactor coolant pumps will continue to be managed by the PINGP Metal Fatigue of Reactor Coolant Pressure Boundary Program and RCP fatigue is managed in accordance with 10 CFR 54.21(c)(1)(iii).

Table 4.3-7 Cumulative Usage Factors for the Units 1 and 2 Reactor Coolant Pumps

Subcomponent	CUF
Casing	0.364
Main flange	0.105
Main Flange Bolts	0.67
Thermal Barrier Flange	0.0002
Water Connections	0.003

4.3.1.6 Class 1 Piping

<u>ANSI B31.1.0 Main Coolant Large Bore Piping</u>

The PINGP Class 1 boundary corresponds to all RC System pressure boundary components within the ASME Section XI, IWB inspection boundary.

RC System piping components, with the exception of a portion of the Reactor Coolant Gas Vent System (RCGVS) piping and Reactor Vessel Level Instrument System (RVLIS) piping attached to the RV closure head, were originally designed in accordance with the American Standard Code for Pressure Piping (ASA) B31.1 1955 Edition (Unit 1) and USA Standard Code for Pressure Piping (USAS) B31.1.0 1967 Edition (Unit 2). The RCGVS and RVLIS piping subassemblies attached to the RV closure head were replaced, and the new piping subassemblies are constructed in accordance with ASME Section III, Subsection NB, 1983 Edition for the RCGVS piping subassembly and the 1998 Edition through 2000 Addenda for the RVLIS piping subassembly. These piping subassemblies are less than 1-inch NPS and were analyzed to Subsection NC requirements in accordance with NB-3630(d).

The primary Class 1 piping fatigue evaluations were originally performed in accordance with B31.1.0 and ASME Section III Subsection NC. A thermal expansion flexibility stress analysis was performed on the main primary coolant piping in accordance with the criteria set forth in B31.1.0 and ASME Section III Subsection NC. For the reactor coolant piping, the analysis was performed to ensure that the stress range is within the limits prescribed in B31.1.0. As per the requirements of B31.1.0, no fatigue analysis was required and hence, no fatigue analysis of the reactor coolant loop piping was performed. Rather, stress range reduction factors are used to account for anticipated transients (normally, a stress range reduction factor of 1.0 is acceptable in the stress analyses for up to 7000 cycles). The stress analysis of the primary coolant piping is considered a TLAA since the stress range reduction factor is dependent on the number of design full temperature cycles.

Thermally induced stresses arising from temperature gradients are limited to a safe and low order of magnitude in assigning a maximum permissible time rate of temperature change on plant heatup, cooldown, and incremental loadings in the plant operating procedures.

The numbers of full temperature thermal cycles experienced by RCS piping is subject to the transient cycle limits identified in Table 4.3-1, and will not exceed 7000 cycles in 60 years of operation. Therefore, the Class 1 piping B31.1.0 stress calculations are valid for the period of extended operation. Thus, the TLAA remains valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i). The cumulative numbers of design transients experienced by the main coolant large bore piping will continue to be managed by the Metal Fatigue of Reactor Coolant Pressure Boundary Program in accordance with 10 CFR 54.21(c)(1)(iii).

Pressurizer Surge Line Piping

In response to NRC Bulletin 88-11, ASME B&PV Code Section III, Subsection NB, 1986 Edition, was used to re-evaluate the pressurizer surge line (including hot leg nozzle and pressurizer surge nozzle) to include the effects of thermal stratification. NRC Bulletin 88-11 addresses potential thermal stresses associated with thermal stratification experienced by the pressurizer surge line. Thermal stratification in the pressurizer surge line can cause unexpected piping movement and potential plastic deformation. The original design of the plant did not consider thermal stratification of the surge line in its analyses. Per NRC Bulletin 88-11, utilities were required to establish and implement a program to confirm pressurizer surge line integrity in view of the occurrence of thermal stratification as a result of the plant heatup/cooldown cycles. PINGP participated in a program to assess the impact of thermal stratification on the surge line (including hot leg nozzle and pressurizer surge nozzle). PINGP operating procedures were modified to decrease the severity of transients resulting from pressurizer surges during heatup and cooldown. PINGP responses to NRC Bulletin 88-11 were provided in Reference 15 and Reference 16. The NRC approved the analysis results for Unit 1 in Reference 14 and Unit 2 in Reference 13.

The maximum cumulative usage factor on the Prairie Island Unit 1 surge line is 0.90 at the reducer under the pressurizer. The Unit 1 hot leg surge nozzle usage factor is 0.70. The maximum usage factor on the Prairie Island Unit 2 surge line is 0.85 at the hot leg nozzle.

The site-specific evaluations of the pressurizer surge line are considered TLAAs since the evaluations use time-limited assumptions such as thermal and pressure transients, and operating cycles. The dominant cycles in the surge line analysis are the 200 design heatup and cooldown transients listed in Table 4.3-1 with various system differential temperatures that include the stratification and striping associated with those transients. As discussed in Section 4.3.1, the number of analyzed heatups and cooldowns, as well as the other design transients presented in Table 4.3-1 will not be exceeded in 60 years of operation. Thus this TLAA remains valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i). The cumulative numbers of design transients experienced by the pressurizer surge line will continue to be managed by the PINGP Metal Fatigue of Reactor Coolant Pressure Boundary Program in accordance with 10 CFR 54.21(c)(1)(iii).

4.3.2 Non-Class 1 Fatigue

The non-Class 1 aging management reviews for PINGP identified non-Class 1 mechanical components that are within the scope of License Renewal and are subject to an aging management review. Based on exposure to thermal cycling, specific components may be subject to cracking by fatigue, and the associated design analyses may be considered TLAAs.

Non-Class 1 fatigue screening criteria provided in industry guidance was used to determine locations potentially susceptible to fatigue cracking in non-Class 1 systems at PINGP. Systems with operating temperatures below the temperature thresholds of 220^{o}F for carbon steel and 270^{o}F for stainless steel were excluded from thermal fatigue consideration since the associated maximum fluid temperature variation would only be 150^{o}F for carbon steel or 200^{o}F for stainless steel relative to an ambient temperature of 70^{o}F.

The first step in the screening process was to identify non-Class 1 components that may have normal/upset condition operating temperatures in excess of 220^{o}F for carbon steel/low alloy steel or 270^{o}F for stainless steel. Based on a review of plant OE, it is not expected that the B31.1.0 systems at PINGP would contain unique conditions that would result in the use of lower temperature thresholds.

The non-Class 1 scoping and screening results reported in Section 2.0 of the LRA identify non-Class 1 mechanical components within the scope of License Renewal that are subject to aging management review. These components fit into two major categories: (1) piping and in-line components (tubing, piping, traps, thermowells, valve bodies, etc.), or (2) non-piping components (tanks, vessels, heat exchangers, pump casings, turbine casings, etc.)

All mechanical systems within the scope of License Renewal were reviewed to identify components within the systems that meet the temperature screening criteria listed above. PINGP Piping Attributes, Piping Specifications and P&IDs were used to determine system design and operating temperatures for each system. Non-Class 1 components that exceeded the temperature screening criteria were reviewed to determine if the number of full temperature design cycles for piping and in-line components would be exceeded at 60 years, and if the design basis of the affected vessel, heat exchanger, storage tank or pump contained any specific fatigue design requirements. A summary of findings is provided below.

Piping and In-Line Components

The impact of thermal cycles on non-Class 1 piping and in-line components is reflected in the calculation of the allowable stress range. The design of ASME Section III, Class 2 and 3, piping systems incorporates a stress range reduction factor for determining acceptability of piping design with respect to thermal stresses. The design of B31.1.0 components also incorporates stress range reduction factors based upon the number of thermal cycles. In general, a stress range reduction factor of 1.0 in the stress analyses applies for up to 7000 thermal cycles. The allowable stress range is reduced by the stress range reduction factor if the number of thermal cycles exceeds 7000. In accordance with the evaluation of PINGP mechanical systems within the scope of License Renewal, the projected thermal cycles for 60 years of plant operation have been evaluated. The results of this evaluation indicate that 7000 thermal cycles will not be exceeded for 60 years of operation for the PINGP systems within the scope of License Renewal. Therefore, the pipe stress calculations remain valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

Pressure Vessel, Heat Exchangers, Storage Tanks and Pumps

In accordance with USAR Section 6, Section 10, and Section 12, PINGP non-Class 1 vessels, storage tanks and pumps within the scope of License Renewal were designed in accordance with ASME Section III Class C and/or ASME Section VIII or equivalent. ASME Section III Subsection NC-3200 and ASME Section VIII Division 2 include fatigue design requirements. Due to conservatism in ASME Section VIII Division 1 and ASME Section III NC-3100 and ND-3000, detailed fatigue analyses are not required. Fatigue analyses are also not required for NC and ND pumps and storage tanks (< 15 psig). If cyclic loading and fatigue usage could be significant, the component designer would have been expected to specify ASME Section VIII Division 2 or NC-3200. The design specification identifies the applicable design code for each component. Therefore, it is concluded that there are no specific fatigue design requirements for PINGP non-Class 1 vessels, heat exchangers and pumps unless specified otherwise by the design specification.

Both ASME Section III NC-3200 and ASME Section VIII Division 2 include provisions for “exemption from fatigue,” which is actually a simplified fatigue evaluation based on materials, configuration, temperature and cycles. Fatigue analysis is not required for other design codes (e.g., ASME Section VIII Division 1, AWWA, MSS, NEMA), and components designed and fabricated with these codes are suitable for the period of extended operation without further evaluation.

The tube side of the residual heat exchangers, letdown and excess letdown heat exchangers, and sample heat exchangers were designed in accordance with ASME Section III Class C. The shell sides of these heat exchangers were designed in accordance with ASME Section VIII, Division 1, for unfired welded pressure vessels. The equipment specification requires that the supplier verify that all conditions of ASME Section III, Paragraph N-415.1 (i.e., exemption from fatigue evaluation for Class 1 components), are satisfied for the transient conditions specified in the equipment specification. The design transients identified in the equipment specifications were reviewed and are consistent with the design transients defined in Table 4.1-8 of the USAR. As described in Section 4.3.1, the assumed numbers of design transients are acceptable for 60 years and the exemption from fatigue evaluation considered in the original design of the residual heat exchangers, letdown and excess letdown heat exchangers, and sample heat exchangers will remain valid during the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i). The cumulative numbers of design transients experienced by the subject heat exchangers will continue to be managed by the Metal Fatigue of Reactor Coolant Pressure Boundary Program in accordance with 10 CFR 54.21(c)(1)(iii).

The tube and shell sides of the regenerative heat exchangers were designed in accordance with ASME Section III Class C. The equipment specification specifies that the supplier shall verify in writing that all conditions of ASME Section III, Paragraph N-415.1 (i.e., exemption from fatigue evaluation for Class A components), are satisfied for the transient conditions specified in the equipment specification. The design transients identified in the equipment specification were reviewed and are consistent with the design transients defined in Table 4.1-8 of the USAR. As described in Section 4.3.1, the assumed number of design transients are acceptable for 60 years and the exemption from fatigue evaluation considered in the original design of the regenerative heat exchangers will remain valid during the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i). The cumulative numbers of design transients experienced by the applicable heat exchangers will continue to be managed by the Metal Fatigue of Reactor Coolant Pressure Boundary Program in accordance with 10 CFR 54.21(c)(1)(iii).

4.3.3 Environmentally-Assisted Fatigue (GSI-190)

Test data indicate that certain environmental effects (such as temperature and dissolved oxygen content) in the primary systems of light water reactors could result in greater susceptibility to fatigue than would be predicted by fatigue analyses based on the ASME Section III design fatigue curves. The ASME design fatigue curves were based on laboratory tests in air and at low temperatures. Although the failure curves derived from laboratory tests were adjusted to account for effects such as data scatter, size effect, and surface finish, these adjustments may not be sufficient to account for actual plant operating environments.

As reported in SECY-95-245, the NRC concluded that no immediate staff or licensee action was necessary to deal with the environmentally-assisted fatigue issue. In addition, the staff concluded that it could not justify requiring a backfit of the environmental fatigue data to operating plants. However, the NRC also concluded that, because metal fatigue effects increase with service life, environmentally-assisted fatigue should be evaluated for any proposed extended period of operation for License Renewal.

NUREG/CR-6260 applied the fatigue design curves that incorporated environmental effects to several plants and identified locations of interest for consideration of environmental effects. Section 5.5 of NUREG/CR-6260 identified selected component locations to evaluate in older vintage Westinghouse plants, such as PINGP. The corresponding PINGP locations are as follows:

1. Reactor vessel shell and lower head
2. Reactor vessel inlet and outlet nozzles
3. Pressurizer surge line (hot leg nozzle safe end)
4. RCS piping charging system nozzle
5. RCS piping safety injection accumulator nozzle
6. RHR Class 1 piping tee

Determination of Fatigue Usage Unadjusted for Environmental Effects

For the NUREG/CR-6260 locations listed above, design basis cumulative usage factors are reported in Section 4.3.1.1 for the reactor vessel shell and lower head and the reactor vessel inlet and outlet nozzles. Cumulative usage factors generated in response to NRC Bulletin 88-11 are reported in Section 4.3.1.6 for the pressurizer surge line piping (including the hot leg surge nozzles). The limiting pressurizer surge line location reported in NUREG/CR-6260 is at the safe end connected to the hot leg nozzle.

The PINGP primary Class 1 piping NUREG/CR-6260 locations are designed in accordance with B31.1.0, and explicit fatigue analyses were not required. To support License Renewal, fatigue usage has been calculated for the charging system nozzle, safety injection accumulator nozzle, and the RHR Class 1 piping tee.

PINGP generated cumulative usage factors for the safety injection accumulator nozzle and the RHR Class 1 piping tee using ASME Section III, 1989 Edition with 1989 Addenda. Transients defined for these locations include inadvertent RCS depressurization, inadvertent accumulator blowdown, RHR operation during plant cooldown, RCS refueling, high head safety injection, and OBE. The usage factors for the safety injection accumulator nozzle and RHR Class 1 piping tee are reported in Table 4.3-8.

The usage factor for the charging nozzle reported in Table 4.3-8 is an assessment of projected usage based on development of transfer functions, review of actual recorded transient data, and the projection of that data and cycles through 60 years of operation. Transfer functions are the formulae and algorithms necessary to express the total local stress at the monitoring location as a function of various system parameters as measured and reported by the available plant process instruments.

Typically, transfer functions are expressed in two stages. The first stage derives local boundary conditions (pressure, fluid temperature, flow rate) at the location being monitored based on the available system instruments. The second stage calculates the local stress components based on the time history of the local conditions. This includes direct stress terms (Pressure, Thermal Expansion, Bi-metallic, etc.) and time-dependent terms (e.g., Green's Functions). Plant operating history and data were reviewed and used to generate the estimated usage at the charging nozzle from the beginning of plant operation through February 2007. Transient projections were then made to the end of 60 years and entered into the transfer functions to calculate total usage. The projected usage is reported in Table 4.3-8.

Determination of Environmentally-Assisted Fatigue Usage

PINGP evaluated the NUREG/CR-6260 locations using the guidance provided in NUREG-1801. NUREG-1801 calls for using the guidance (formulas) provided in NUREG/CR-5704 for austenitic stainless steel and NUREG/CR-6583 for carbon steel and low-alloy steel to calculate environmentally-assisted fatigue correction factors (Fen). The correction factors are applied to the cumulative usage factors reported in Table 4.3-8 to obtain an adjusted cumulative usage factor to account for environmental effects.

Carbon Steel

For PINGP, none of the locations identified in NUREG/CR-6260 are made of carbon steel, so calculation of the Fen for carbon steel is not required.

Low Alloy Steel

The environmentally assisted fatigue correction factor (Fen) for low alloy steel is calculated as follows:

$Fen = \exp(0.929 - 0.00124T - 0.101S^*T^*O^*\varepsilon^*)$, where:

Fen = fatigue life correction factor

T = fluid service temperature of transient, °C
(Note: In "- 0.00124T" expression only, T is taken as room temperature, 25°C)

$S^* = S$ for $0 <$ sulfur content, $S \leq 0.015$ wt. %
$= 0.015$ for $S > 0.015$ wt. %

$T^* = 0$ for $T < 150°C$
$= (T-150)$ for $150°C \leq T \leq 350°C$

$O^* = 0$ for dissolved oxygen, DO < 0.05 parts per million (ppm)

$= \ln\left(\frac{DO}{0.04}\right)$ for $0.05 \text{ ppm} \le DO \le 0.5$ ppm

$= \ln(12.5)$ for DO > 0.5 ppm

$\varepsilon^* = 0$ for strain rate, $\varepsilon > 1$ %/sec

$= \ln(\varepsilon)$ for $0.001 \le \varepsilon \le 1$ %/sec

$= \ln(0.001)$ for $\varepsilon < 0.001$ %/sec

It is assumed that when the DO levels exceed 0.05 ppm when the RPV head is removed and reinstalled, the RCS temperature will stay below 150°C. As such, the increased DO levels during that process will not affect the Fen calculations. For a PWR environment the DO is assumed to be below 0.05 ppm above 150°C and O*=0.

Therefore, the Fen for low alloy steel is 2.455.

Austenitic Stainless Steel

The environmentally-assisted fatigue correction factor (Fen) for austenitic stainless steel is calculated as follows:

For Types 304 and 316 Stainless Steel

$Fen = \exp(0.935 - T^*\varepsilon^*O^*)$ where:

Fen = fatigue life correction factor

T = fluid service temperature of transient, °C

$T^* = 0$ for $T < 200°C$

$= 1$ for $T \ge 200°C$

$\varepsilon^* = 0$ for strain rate, $\varepsilon > 0.4$%/sec

$= \ln\left(\frac{\varepsilon}{0.4}\right)$ for $0.0004 \le \varepsilon \le 0.4$%/sec

$= \ln\left(\frac{0.0004}{0.4}\right)$ for $\varepsilon < 0.0004$%/sec

$O^* = 0.260$ for dissolved oxygen, DO < 0.05 parts per million (ppm)

$= 0.172$ for DO ≥ 0.05 ppm

Therefore, the Fen for Stainless Steel is:

Fen = 2.55 (T < 200°C, any ε, any DO)
Fen = 2.55 (T $\geq$ 200°C, $\varepsilon \geq$ 0.4%/sec, any DO)
Fen = 3.78 (T $\geq$ 200°C, ε = 0.04%/sec, DO $\geq$ 0.05 ppm)
Fen = 4.64 (T $\geq$ 200°C, ε = 0.04%/sec, DO < 0.05 ppm)
Fen = 5.62 (T $\geq$ 200°C, ε = 0.004%/sec, DO $\geq$ 0.05 ppm)
Fen = 8.45 (T $\geq$ 200°C, ε = 0.004%/sec, DO < 0.05 ppm)
Fen = 8.36 (T $\geq$ 200°C, $\varepsilon \leq$ 0.0004%/sec, DO $\geq$ 0.05 ppm)
Fen = 15.35 (T $\geq$ 200°C, $\varepsilon \leq$ 0.0004%/sec, DO < 0.05 ppm)

PINGP EAF Results

There are three low alloy steel NUREG/CR-6260 locations at PINGP: RPV outlet nozzle, RPV inlet nozzle, and RPV shell to lower head. When the design CUFs at these locations are multiplied by an Fen of 2.455, the environmentally-adjusted CUFs are all below 1.0. The resulting unadjusted and adjusted values of CUF are reported in Table 4.3-8. The environmentally-adjusted CUFs of the RPV outlet nozzle, RPV inlet nozzle and RPV shell to lower head have been projected to the end of the period of extended operation in accordance with 10 CFR 54.21(c)(1)(ii). The cumulative numbers of design transients experienced by the locations of interest will continue to be managed using cycle counting under the Metal Fatigue of Reactor Coolant Pressure Boundary Program in accordance with 10 CFR 54.21(c)(1)(iii).

The remaining NUREG/CR-6260 locations are stainless steel. The pressurizer surge line hot leg nozzle safe end environmentally-adjusted CUF, using CUFs calculated in response to NRC Bulletin 88-11 (Section 4.3.1.6), was greater than 1.0. However, PINGP has calculated usage at the pressurizer surge line hot leg nozzle at 60 years by computing the actual alternating stress history based upon transfer functions and actual plant data. Fatigue usage was computed from the loading spectrum determined from the stress history, and projected to 60 years. These CUFs were multiplied by the bounding Fen of 15.35. The resulting unadjusted and adjusted values of CUF are reported in Table 4.3-8; both are less than 1.0. PINGP will manage EAF at the hot leg nozzle safe end using stress-based fatigue monitoring under the Metal Fatigue of Reactor Coolant Pressure Boundary Program in accordance with 10 CFR 54.21(c)(1)(iii).

Environmentally-adjusted CUFs for the safety injection accumulator nozzle and RHR Class 1 piping tee are below 1.0. The safety injection nozzle and RHR tee environmentally-adjusted CUFs are based on an ASME Section III analyses multiplied by a bounding Fen. The resulting unadjusted and adjusted values of CUF are reported in Table 4.3-8. The environmentally-adjusted CUFs for the safety injection nozzle and RHR tee have been projected to the end of the period of extended operation in accordance with 10 CFR 54.21(c)(1)(ii). The transients used for the fatigue evaluation will be added to the Metal Fatigue of Reactor Coolant Pressure Boundary Program and EAF at these locations will be managed using cycle-based fatigue monitoring in accordance with 10 CFR 54.21 (c)(1)(iii).

Environmentally-adjusted CUFs for the charging system nozzle are projected to be below 1.0 at 60 years. PINGP has calculated usage at the charging nozzle at 60 years by computing the actual alternating stress history based upon transfer functions and actual plant data. Fatigue usage was computed from the loading spectrum determined from the stress history, and projected to 60 years. These CUFs were multiplied by the bounding F_{en} of 15.35. The resulting unadjusted and adjusted CUFs are reported in Table 4.3-8. EAF at the charging nozzle will be managed during the period of extended operation using stress-based fatigue monitoring under the Metal Fatigue of Reactor Coolant Pressure Boundary Program in accordance with 10 CFR 54.21(c)(1)(iii).

Table 4.3-8 Summary of EAF Results - Prairie Island Units 1 and 2

Component	Material	Unadjusted CUF	F_{en}	CUF Adjusted for Environmental Effects
RPV Outlet Nozzle	Low Alloy Steel	0.035	2.455	0.086
RPV Inlet Nozzle	Low Alloy Steel	0.0165	2.455	0.041
RPV Shell and Lower Head	Low Alloy Steel	0.001	2.455	0.0027
Pressurizer Surge Line Hot Leg Nozzle Safe End	Stainless Steel	0.000861(U1)[1] 0.000557(U2)[1]	15.35	0.013 (U1)[1] 0.0085 (U2)[1]
Safety Injection Accumulator Nozzle	Stainless Steel	0.0377 (U1) 0.0318 (U2)	15.35	0.579 (U1) 0.488 (U2)
Charging System Nozzle	Stainless Steel	0.0626 (U1)[1] 0.051 (U2)[1]	15.35	0.961 (U1)[1] 0.783 (U2)[1]
RHR Class 1 Piping Tee	Stainless Steel	0.0214 (U1) 0.0129 (U2)	2.55	0.0546 (U1) 0.0329 (U2)

[1]Results from stress-based fatigue usage calculation based on actual plant data, transfer functions, and transient projection to 60 years

4.4 Environmental Qualification

4.4.1 Environmental Qualification of Electrical Components

10 CFR 50.49, Environmental Qualification of Electrical Equipment Important to Safety for Nuclear Power Plants, requires that an environmental qualification program be established to demonstrate that certain electrical components located in “harsh” plant environments are qualified to perform their safety function in those harsh environments after the effects of in-service aging. The PINGP Environmental Qualification (EQ) of Electrical Components Program (EQ Program) meets the requirements of 10 CFR 50.49 for the applicable components important to safety.

10 CFR 50.49(e)(5) contains provisions for aging management that include consideration of all significant types of aging degradation that can affect component functional capability. 10 CFR 50.49(e)(5) also requires replacement or refurbishment of components qualified for less than the current license term prior to the end of designated life unless additional life is established through ongoing qualification activities. Supplementary guidance for the program is provided in Division of Operating Reactors (DOR) Guidelines, NUREG-0588, Regulatory Guide 1.89, and in Generic Letter 82-09.

The PINGP EQ Program manages component thermal, radiation and cyclical aging through the use of aging evaluations based on 10 CFR 50.49(f) qualification methods. Aging evaluations for EQ components that specify a qualification of at least 40 years are considered TLAAs for License Renewal. When qualification time limits are approached, whether during the initial 40-year license term or the period of extended operation, the program requires replacement, refurbishment or reanalysis to extend the qualification of components under 10 CFR 50.49(e).

Reanalysis is an acceptable alternative for extending the qualified life of an EQ component. Important attributes of a reanalysis include analytical methods, data collection and reduction methods, underlying assumptions, acceptance criteria and corrective actions (if acceptance criteria are not met). These attributes are discussed in more detail below.

- Analytical Methods - The PINGP EQ Program uses the same analytical models in the reanalysis of an aging evaluation as those previously applied for the current evaluation. Arrhenius methodology is an acceptable model for performing a thermal aging evaluation. The analytical method used for a radiation aging evaluation is to demonstrate qualification for the total integrated dose (that is, normal radiation dose for the projected installed life plus accident radiation dose). For License Renewal, acceptable methods for establishing the 60-year normal radiation dose includes multiplying the 40-year normal radiation dose by 1.5 (that is, 60 years/40 years) or using the actual calculated value for 60 years. The result is added to the accident radiation dose to obtain the total integrated dose for the component.

- Data Collection and Reduction Methods - Reducing excess conservatism in the component service conditions (for example, temperature, radiation, cycles) used in the prior aging evaluation is the primary method used for a reanalysis per the EQ Program.
- Underlying Assumptions - EQ component aging evaluations contain sufficient conservatism to account for most environmental changes occurring due to plant modifications and events. When unexpected adverse conditions are identified during operational or maintenance activities that affect the normal operating environment of a qualified component, the affected EQ component is evaluated and appropriate corrective actions are taken, which may include changes to the qualification bases and conclusions.
- Acceptance Criteria and Corrective Action - The reanalysis of an aging evaluation could extend the qualification of the component. If the qualification cannot be extended by reanalysis, the component is maintained, replaced, or re-qualified prior to exceeding the period for which the current qualification remains valid.

In summary, the Environmental Qualification (EQ) of Electrical Components Program will manage the effects of aging of EQ electrical components to assure their intended function(s) will continue to be performed consistent with the CLB. Therefore, the environmental qualification of electrical components will be managed consistent with 10 CFR 54.21(c)(1)(iii) for the period of extended operation.

4.5 Concrete Containment Tendon Prestress (Not Applicable)

The prestressing tendons in prestressed concrete containments lose their prestressing forces with time due to creep and shrinkage of concrete, and relaxation of the prestressing steel. During the design phase, engineers estimate these losses to arrive at the predicted prestressing forces at the end of operating life, normally forty years. The loss of tendon prestress analysis is a TLAA only for prestressed concrete containments.

PINGP does not have a prestressed concrete containment and this topic is not applicable to PINGP.

4.6 Containment and Penetration Fatigue Analyses

The total containment for each Unit consists of a primary containment and a secondary containment. The primary and secondary containments are comprised of two separate structures: the primary containment is provided by the Reactor Containment Vessel and the secondary containment by the Shield Building.

The primary containment consists of a steel structure and its associated engineered safety features. The primary containment, also referred to as the Reactor Containment Vessel, is a low-leakage steel shell, including its penetrations, designed to confine the radioactive materials that could be released by accidental loss of integrity of the Reactor Coolant (RC) System pressure boundary.

The secondary containment consists of a concrete structure, the Shield Building, with its associated engineered safety features.

Fatigue is a consideration for the Reactor Containment Vessels and associated hot penetrations as described below.

4.6.1 Reactor Containment Vessel Fatigue

The Reactor Containment Vessel (RCV) is a cylindrical steel pressure vessel with hemispherical dome and ellipsoidal bottom which houses the reactor pressure vessel, steam generators, reactor coolant pumps, reactor coolant piping, accumulators of the SI System, pressurizer, pressurizer relief tank and other branch connections of the RC System.

The RCV is completely enclosed by the Shield Building. The Shield Building has the shape of a right circular cylinder with a shallow dome roof. A five-foot annular space is provided between the RCV and the Shield Building. Clearance at the roof of the Shield Building is seven feet.

The design, fabrication, inspection, and testing of the RCVs comply with the requirements of the ASME Boiler and Pressure Vessel Code, Section II, Materials; Section III, Nuclear Vessels, Subsection B, Requirements for Class B Vessels; Section VIII, Unfired Pressure Vessels; and Section IX, Welding Qualifications. The RCV design and construction meet all the requirements of state and local building codes.

The RCV is a Class B vessel as defined in the ASME Boiler and Pressure Vessel Code, Section III, Nuclear Vessels N-132. The vessel is fabricated from SA516 Grade 70 steel plate meeting SA 300 requirements except that impact test requirements are as specified in ASME Boiler and Pressure Vessel Code, Section III, N-1211(a). The design report for the RCV contained a review of Subsection B of ASME Code Section III. As required by paragraph N-1314 of the code, the review included a review of paragraph N-415.1 to determine if an analysis for cyclic operation was required.

The inputs for this review came from the design specification that specified the number of cycles of pressurization of the vessel from atmospheric pressure to design pressure to be 40. Because the only time the vessel would experience a pressurization cycle would be for integrated leak rate testing that is typically performed at 10-year intervals, or in an accident, the assumption is considered conservative, and will remain valid through the period of extended operation.

The design specification also provided the input for the number of temperature variations during the life of the vessel between 50°F and 120°F, which was specified as 200. The operating temperature of the RCV stays relatively constant during normal plant operation as the Shield Building effectively isolates the RCV from outdoor weather, and temperature variations are only expected during plant shutdown periods. The temperature variations of the RCV can be correlated to plant heatup and cooldown cycles, which are shown in Section 4.3.1 to be limited to 200 over 60 years. Therefore, this assumption will remain valid through the period of extended operation.

Using these assumptions as inputs, paragraph N-415.1 of Subsection B, ASME Section III, was reviewed and it was determined that a cyclic or fatigue analysis was not required. The number of design cycles used to demonstrate the exemption from fatigue analysis in accordance with Articles N-415 (a)-(f) will not be exceeded during the period of extended operation. Therefore, the original evaluation for exemption from fatigue analysis for the RCVs will remain valid for an additional 20 years of operation. Therefore, the conclusion that a fatigue analysis of the RCVs is not required by the code remains valid for the period of extended operation.

This result demonstrates that the exemption from fatigue analysis for the RCV will remain valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

4.6.2 Containment Penetration Fatigue

All process lines traverse the boundary between the inside of the RCV and the outside of the Shield Building by means of piping penetration assemblies made up of several elements. Two general types of piping penetration assemblies are provided; i.e., those that are not required to accommodate thermal movement (designated as cold penetrations) and those that accommodate thermal movement (hot penetrations).

Both hot and cold piping penetration assemblies consist of a containment penetration nozzle, a process pipe, a Shield Building penetration sleeve and a Shield Building flexible seal. In the case of a cold penetration, the RCV penetration nozzle is an integral part of the process pipe. For hot penetrations, a multiple-flued head becomes an integral part of the process pipe, and is used to attach a guard pipe and an expansion joint bellows.

A hot piping penetration assembly is used when the differential temperature between the normal operating temperature of the fluid carried by a process line and the RCV wall temperature would create unacceptable thermal or cyclic stress at the attachment of the vessel penetration nozzle. This is defined as a process line temperature that operates greater than 250°F. The following are designed as hot piping penetrations:

- Main Steam lines, penetrations 6A and 6B
- Main Feedwater lines, penetrations 7A and 7B
- Steam Generator Blowdown lines, penetrations 8A and 8B
- Residual Heat Removal lines, penetrations 9 and 10
- Letdown line, penetration 11

In addition to the elements contained in a cold piping penetration assembly, a hot assembly has a multiple-flued head, a guard pipe, an expansion bellows and an impingement ring. The multiple-flued head is machined from a solid forging. It is welded into, and becomes an integral part of, the process line. The inner flue provides support for the guard pipe and the outer flue provides support for the expansion joint bellows. The guard pipe is located concentric to the process pipe, and is cantilever-supported by a weld attachment to the inner flue of the flued head. The length of the guard pipe is set so that it extends past the RCV penetration nozzle into the vessel.

The multiple-flued head with its associated guard pipe and expansion joint bellows provides a leak-tight seal for the extension of the containment boundary. Where hot penetration assemblies traverse the Shield Building annulus, they are designed to provide considerable margin between code allowable stress values and maximum calculated stresses in the pipe. This was accomplished by using 1.5 times the system design pressure to calculate the pipe wall thickness for the process and guard pipe, using the formula and allowable stresses given in USAS B31.1.0-1967. Under the normal USAS B31.1.0 code practice, the system design pressure alone is adequate for calculating the pipe wall thickness. The same procedure was used to set the thickness of the guard pipe and the multiple-flued head.

An extensive review of plant documentation concerning penetrations and penetration assemblies was performed, and it was determined that no specific analysis of fatigue was performed. The penetration assemblies, including the process pipe, guard pipe, and flued heads were designed in accordance with USAS B31.1.0, and can be considered to be subject to the cyclic operation stress range reduction factor listed in USAS B31.1.0 paragraph 102.3.2. The stress range reduction factor begins to decrease the code allowable stress when the number of thermal cycles become greater than 7,000. The lines penetrating the RCV that are designed as hot penetration assemblies are listed above.

The main steam lines and main feedwater lines are thermally cycled by heatup and cooldown of the secondary plant, which correlates with RC System heatup and cooldown, and reactor trips. A review of B31.1.0 fatigue for systems listed above is provided in Section 4.3.2. As discussed in Section 4.3.1, the numbers of applicable design transients will not be exceeded in 60 years of plant operation. The results of this evaluation indicate that 7,000 thermal cycles will not be exceeded for 60 years of operation for any of the hot penetrations. Therefore this TLAA will remain valid through the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

4.7 Other Plant-Specific Time-Limited Aging Analyses

Other PINGP-specific TLAAs include leak-before-break (LBB) analyses, underclad cracking, RCP flywheel, fatigue analysis of cranes, and the probabilistic evaluation of turbine missiles.

4.7.1 RCS Piping Leak-Before-Break Analyses

Leak-before-break (LBB) analyses evaluate postulated flaw growth in piping to alter the structural design basis. These analyses consider the thermal aging of the CASS piping and fatigue transients that drive the flaw growth over the operating life of the plant. Because these two analyses considerations could be influenced by time, LBB analyses are identified as potential TLAAs for PINGP Units 1 and 2.

Unit 1

In 1984, Westinghouse performed LBB analyses for the Unit 1 primary loop piping. In 1991, Westinghouse performed LBB analyses for the Unit 1 pressurizer surge line. The results of the analyses are documented in WCAP-10640-NP/WCAP-10639-P for the main coolant piping (Reference 17) and WCAP-12876-NP/WCAP-12877-P for the pressurizer surge line (Reference 15). WCAP-10640-NP, established the methodology to evaluate thermal aging fracture toughness properties for LBB analyses of cast austenitic stainless steel in the primary loop fittings; the pipe straight sections are made from forgings. The NRC approved the application of the LBB methodology to PINGP Unit 1 primary loop piping in 1986 (Reference 20). The NRC approved the Unit 1 surge line LBB analysis in September 1992 (Reference 14). The time-related assumptions include the thermal aging of cast austenitic stainless steel large bore main coolant piping and the fatigue crack growth analyses of both large bore main coolant piping and the surge line. These two assumptions are addressed below.

Unit 2

In 1986, Westinghouse performed LBB analyses for the Unit 2 primary loop piping. The results of the analyses are documented in WCAP-10928-NP for the main coolant piping (Reference 19). WCAP-10928-NP established the methodology to evaluate thermal aging fracture toughness properties for LBB analyses of cast austenitic stainless steel in the primary loop pipe and fittings. The NRC approved the application of the LBB methodology to PINGP in 1986 (Reference 20). The time-related assumptions include the thermal aging of cast austenitic stainless steel and the fatigue crack growth analysis. These two assumptions are addressed below.

Thermal Embrittlement of CASS

The first analysis consideration in WCAP-10640-NP and WCAP-10928-NP that could be influenced by time is the material properties of cast austenitic stainless steel used in the pipe fittings. Thermal aging causes an elevation in the yield strength of CASS and a decrease in fracture toughness, the decrease being proportional to the level of ferrite in the material. Thermal aging in these stainless steels will continue until a saturation, or fully aged, point is reached. WCAP-10640-NP, WCAP-10928-NP, and WCAP-10930-NP address the fracture toughness properties of statically cast CF8M stainless steel. Specifically, fully aged fracture toughness values were used to conservatively calculate the J_{IC} values for the cast pipe and fittings. As the LBB evaluations for both Units use fully aged fracture toughness properties, these analyses do not have a material property time-dependency and are not considered TLAAs.

Fatigue Crack Growth

The second analysis consideration that could be influenced by time is the accumulation of actual fatigue transient cycles used in WCAP-10640-NP, WCAP-12876-NP, and WCAP-10928-NP. Fatigue crack growth rate laws in a PWR environment were developed based on available industry literature. The crack growth rate laws were evaluated for all normal, upset, and test reactor vessel fatigue transients.

Section 6.0 of WCAP-10640-NP, WCAP-12876-NP, and WCAP-10928-NP evaluate fatigue crack growth based on NSSS design transients. These design transients have not been changed or increased for License Renewal as discussed in Section 4.3. Therefore, the LBB TLAA remains valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i). The cumulative numbers of design transients experienced by RC System CASS piping and fittings will continue to be managed by the Metal Fatigue of Reactor Coolant Pressure Boundary Program in accordance with 10 CFR 54.21(c)(1)(iii).

4.7.2 Reactor Vessel Underclad Cracking

Intergranular separations (underclad cracking) in low alloy steel heat-affected zones under austenitic stainless steel weld claddings were first detected in SA-508, Class 2, reactor vessel forgings in 1970 during examination of the Atucha reactor vessel. They have been reported to exist in SA-508, Class 2, reactor vessel forgings manufactured to a coarse grain practice and clad by high-heat-input submerged arc processes. The regulatory position regarding this issue is found in Regulatory Guide (RG) 1.43, “Control of Stainless Steel Weld Cladding of Low-Alloy Steel Components.” RG 1.43 states that detection of underclad cracks “normally requires destructively removing the cladding to the weld fusion line and examining the exposed base metal either by metallographic techniques or with liquid penetrant or magnetic particle testing methods.”

A detailed analysis of underclad cracks is provided in topical report WCAP-7733, dated July 1971, in which Westinghouse presented a fracture mechanics analysis to justify the continued operation of Westinghouse Units for 32 EFPY with underclad cracks in the reactor pressure vessels (RPVs). The analysis reported in WCAP-7733 was identified by the WOG and NRC as a TLAA that required evaluation for License Renewal. By letter dated March 1, 2001, as supplemented by letters dated June 15 and July 31, 2001, the WOG submitted WCAP-15338 for NRC review. WCAP-15338 evaluates the impact of cracks in SA-508 Class 2 and SA-508 Class 3 forgings beneath austenitic stainless steel weld cladding on RPV integrity. The NRC SER was issued on October 15, 2001, and applied to Westinghouse 3-loop plants only. The WOG provided a written clarification to Renewal Action Item 4.1(1) in a letter dated June 19, 2002, to include all Westinghouse plants. The NRC issued a revised SER in September 2002 to include all Westinghouse plants.

A review of licensing correspondence dating back to 1969 found no references to WCAP-7733, but did identify PINGP-specific references to underclad cracking evaluations reported in USAR Section 4.2.3.4 (WCAP-9887, WCAP-9772, WCAP-9811, and WCAP-9980). The PINGP reactor vessels contain SA 508, Class 3, forgings in the beltline, inlet and outlet nozzles, and safety injection nozzles. Therefore, the evaluation contained in WCAP-15338 may be used to demonstrate that fatigue growth of the subject flaws is insignificant over 60 years and the presence of the underclad cracks are of no concern relative to the structural integrity of the vessels. In order to reference WCAP-15338, the License Renewal applicant must complete the following action items.

1. The License Renewal applicant is to verify that its plant is bounded by the WCAP-15338 report. Specifically, the renewal applicant is to indicate whether the number of design cycles and transients assumed in the WCAP-15338 analysis bounds the number of cycles for 60 years of operation of its RPV.
2. 10 CFR 54.21(d) requires that the FSAR supplement for the facility contains a summary description of the programs and activities for managing the effects of aging and the evaluation of TLAAs for the period of extended operation. Those applicants for License Renewal referencing the WCAP-15338 report for the RPV components shall ensure that the evaluation of the TLAAs is summarily described in the FSAR supplement.

The design cycles and transients for PINGP are reported in Table 4.1-8 of the PINGP USAR and restated in LRA Table 4.3-1. The numbers of design cycles and transients assumed in the WCAP-15338 analysis bound the numbers of design cycles and transients projected for 60 years of operation presented in Table 4.3-1. Therefore, action item 1 above is satisfied. The PINGP-specific analyses reported in WCAP-9887, WCAP-9772, WCAP-9811, and WCAP-9980 are superseded by the 60-year evaluation reported in WCAP-15338-A.

A summary of this TLAA evaluation to be incorporated into the USAR is provided in Section A4.6. Therefore, action item 2 above is also satisfied.

This result demonstrates that the analysis of underclad cracking for PINGP remains valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i). The cumulative numbers of design transients experienced by the reactor vessel will continue to be managed by the Metal Fatigue of Reactor Coolant Pressure Boundary Program in accordance with 10 CFR 54.21(c)(1)(iii).

4.7.3 Reactor Coolant Pump Flywheel

The reactor coolant pump motors are large, vertical, squirrel cage, induction motors. The motors have flywheels to increase rotational-inertia, thus prolonging pump coastdown and assuring a more gradual loss of main coolant flow to the core in the event that pump power is lost. The flywheel is mounted on the upper end of the rotor, above the upper radial bearing and inside the motor frame. The aging effect of concern is fatigue crack initiation and growth in the flywheel bore keyway from stresses due to starting the motor.

In an effort to revise the RCP flywheel inspection frequency and scope, NMC submitted a License Amendment Request in 2004 based on WCAP-15666, “Revision to Reactor Coolant Pump Flywheel Inspection Program” (Reference 22). This topical report includes a stress and fracture evaluation which adequately addresses fatigue crack growth for 60 years. Therefore, the analysis of fatigue crack initiation and growth on the RCP flywheel is acceptable for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

4.7.4 Fatigue Analysis of Cranes

In response to NUREG-0612, NMC stated, and the NRC accepted (Reference 23 and Reference 24), that the polar cranes, auxiliary building crane, turbine building cranes, and spent fuel crane were qualified to Electric Overhead Crane Institute (EOCI) Specification #61 but are in compliance with the design standards of CMAA-70, with limited exceptions. Among the criteria of CMAA-70 is a design load cycle limit of 20,000 cycles. (The Class A crane value is limiting.) NMC has reviewed these cranes and determined that even very conservative estimates of the number of cycles to be achieved in 60 years of operation do not exceed the 20,000 cycle limit in CMAA-70. As a result, the crane designs will remain valid for the period of extended operation in accordance with the requirements of 10 CFR 54.21(c)(1)(i).

4.7.5 Probability of Damage to Safeguards Equipment from Turbine Missiles

Fully integral turbine rotors were installed at Unit 1 in 1997 and Unit 2 in 1998. A probabilistic evaluation was completed to support the installation that included an evaluation of the probability of damage to safeguards equipment from turbine missiles. The probabilistic evaluation includes a time-dependent calculation and is a TLAA. A description of the evaluation is contained in Section 12.2.7 of the PINGP USAR, and is summarized below.

The probability of unacceptable damage to safeguards equipment resulting from turbine missiles must be maintained less than $1x10^{-7}$ to satisfy the guidelines values of Section 3.5.3 of NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants.” In the case of PINGP (unfavorably-oriented turbine), the product of the "strike" and "damage" probabilities is assumed to equal 10^{-2}; therefore, the probability of "ejection" of internal fragments must be less than 10^{-5} to meet the requirements of the Standard Review Plan.

The probability of "ejection," is the sum of the probability of missile ejection at running speed, design overspeed and destructive overspeed. In the case of running speed and design overspeed, both low cycle and high cycle fatigue mechanisms have failure probabilities well below NRC accepted guidelines and are not controlling. The potential for stress corrosion cracking has the greatest influence on rotor integrity at running speed and design overspeed.

The current methodology of calculating the total probability of "ejection," and demonstrating compliance with NRC acceptance criteria is detailed in WCAP-11525. To be consistent with the established methodology, and good engineering judgement, a margin of $5x10^{-6}$ per year is considered adequate to cover the missile ejection probabilities at running and design overspeed.

The fully integral rotor construction greatly reduces the chance of formation of stress corrosion cracks with the result that the probabilities of missile ejection at running and design overspeed are demonstrated to be less than $5x10^{-6}$ even for 20 years of operation between inspection (USAR, Figure 12.2-38). In the case of destructive overspeed missile ejection, the probability is controlled by turbine valve test frequency as discussed in USAR Section 11.2.3.2, "Turbine Overspeed."

The USAR, Section 12.2.7.1, concludes that the probabilities of missile ejection at running and design overspeed are shown to be less than $5x10^{-6}$ at the end of the current term of operation; therefore, it is concluded that periodic in-service inspections are not required for the fully integral nuclear low pressure rotors to meet the requirements of the Standard Review Plan.

This probabilistic evaluation is a TLAA for PINGP since periodic in-service inspection frequency of the rotors is based on the requirement that the probabilities of missile ejection remain below $5x10^{-6}$, and failure probability is a function of time as shown in Figure 12.2-38 of the USAR.

The failure probability shown in Figure 12.2-38 of the USAR includes inspection interval in years after installation, which is 1997 for Unit 1 and 1998 for Unit 2. In accordance with the USAR, Figure 12.2-38, a failure probability of $5x10^{-6}$ is reached at approximately 37 years after installation, or 2034 for Unit 1 and 2035 for Unit 2. This exceeds the end of the period of extended operation for Unit 1 (2033) and Unit 2 (2034). Therefore, the analysis of probability of turbine rupture due to stress corrosion and the conclusion that periodic inspections are not required remains valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

Section 4.0 References

1. NRC letter to NSP dated April 22, 1994, Generic Letter 92-01, Revision 1, Reactor Vessel Integrity Prairie Island Nuclear Generating Plant, Unit Nos. 1 and 2
2. NSP letter to NRC dated May 19, 1994, Response to April 22, 1994 request for additional information, Generic Letter 92-01, Revision 1, Reactor Vessel Structural Integrity
3. NSP letter to NRC dated September 16, 1998, Supplemental Response for Generic Letter 92-01, Reactor Vessel Structural Integrity
4. NSP letter to NRC dated September 01, 1999, Comments on Reactor Vessel Integrity Database (RVID2 Version 2 Draft)
5. Prairie Island Nuclear Generating Plant Units One and Two, Pressure and Temperature Limits Report, Revision 3 (effective until 35 EFPY), October 2002 (submitted in NSP letter to NRC dated November 7, 2002)
6. WCAP-14040-NP-A, Revision 4, Methodology Used to Develop Cold Overpressure System Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves, J.D. Andrachek, et. al., May 2004 (includes NRC approval letter to Westinghouse dated February 27, 2004)
7. Regulatory Guide 1.190, Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence, March 2001
8. Not Used
9. Not Used
10. WCAP-14780, Revision 3, February 1998, Prairie Island Unit 1 Heatup and Cooldown Limit Curves for Normal Operation (submitted in NSP letter to NRC dated March 6, 1998)
11. WCAP-14637, Revision 3, December 1999, Prairie Island Unit 2 Heatup and Cooldown Limit Curves for Normal Operation (submitted in NSP letter to NRC dated April 6, 2000)
12. NRC letter to NSP dated April 29, 1998, Prairie Island Nuclear Generating Plant, Acceptance for Referencing of Pressure Temperature Limits
13. NRC letter to NSP dated December 20, 1991, Prairie Island Nuclear Generating Plant Unit No. 2 - Pressurizer Surge Line Thermal Stratification - Bulletin 88-11
14. NRC letter to NSP dated September 15, 1992, Prairie Island Unit 1 - Response to NRC Bulletin 88-11

15. NSP letter to NRC dated June 17, 1991, Response to NRC Bulletin 88-11, Pressurizer Surge Line Thermal Stratification [submitted WCAP-12876-non-proprietary and WCAP-12877-proprietary, Technical Justification for Eliminating Pressurizer Surge Line Rupture as the Structural Design Basis for Prairie Island Unit 1]

16. NSP letter to NRC dated February 12, 1991, Response to Bulletin 88-11, Pressurizer Surge Line Thermal Stratification

17. NSP letter to NRC dated October 24, 1984, Elimination of Large Primary Loop Pipe Rupture as Structural Design Basis, Unit 1, [submitted WCAP-10639-proprietary, WCAP-10640 (non-proprietary), Technical Basis for the Elimination of Large Primary Loop Pipe Rupture as the Structural Design Basis for Prairie Island Unit 1]

18. Not Used

19. NSP letter to NRC dated September 10, 1986, Revised Technical Basis for the Elimination of Large Primary Loop Pipe Rupture as the Structural Design Basis, Unit 2 [submitted WCAP-10928, Revision 1-non-proprietary and WCAP-10929, Revision 1-proprietary, Technical Basis for the Elimination of Large Primary Loop Pipe Rupture as the Structural Design Basis for Prairie Island Unit 2; and, WCAP-10930, Revision 1-non-proprietary, and WCAP-10931, Revision 1-proprietary, Toughness Criteria for Thermally Aged CASS Stainless Steel]

20. NRC letter to NSP dated December 22, 1986, Safety Evaluation by the Office of Nuclear Reactor Regulation Related to the Elimination of Large Primary Loop Ruptures as a Design Basis of the Northern States Power Company Prairie Island Nuclear Generating Plants Units 1 and 2

21. Not Used

22. NMC letter to NRC dated October 15, 2004, Application for Technical Specification Improvement to Extend the Inspection Interval for Reactor Coolant Pump Flywheels Using the Consolidated Line Item Improvement Process

23. NSP letter to NRC dated August 31, 1981, Control of Heavy Loads, and NRC letter to NSP dated June 6, 1983 (no title) transmitting SER and TER-C5506-384/385

24. NSP letter to NRC dated November 8, 1982, Control of Heavy Loads (Response to Staff Concerns on the Six Month Submittal)

APPENDIX A

USAR SUPPLEMENT

APPENDIX A

Table of Contents

APPENDIX A

Table of Contents

APPENDIX A

Table of Contents

A1.0 Introduction

The application for a renewed operating license is required by 10 CFR 54.21(d) to include an Updated Safety Analysis Report (USAR) Supplement. The supplement must contain summary descriptions of the programs and activities for managing the effects of aging, and of the evaluations of Time-Limited Aging Analyses (TLAAs) for the period of extended operation. This appendix provides the required supplement for the PINGP USAR.

Section A2.0 of this appendix contains summary descriptions of the programs used to manage the effects of aging during the period of extended operation. Section A3.0 contains descriptions of programs used for management of TLAAs during the period of extended operation. Section A4.0 contains summaries of TLAA evaluations applicable to the period of extended operation. Section A5.0 discusses the incorporation of final License Renewal commitments into the USAR.

Following the issuance of the renewed operating license, the summary descriptions of aging management programs and TLAAs provided in Appendix A, and the final list of License Renewal commitments, will be incorporated into the PINGP USAR as part of a periodic USAR update in accordance with 10 CFR 50.71(e). Other changes to specific sections of the PINGP USAR necessary to reflect a renewed operating license will also be addressed at that time. Following inclusion of this information into the USAR, changes to the descriptions of the aging management programs and activities, if any, will be made in accordance with applicable requirements of 10 CFR 50.71(e) and 10 CFR 50.59.

A2.0 Summary Descriptions of Programs that Manage the Effects of Aging

This section provides summaries of programs and activities credited in the License Renewal Application for managing the effects of aging during the period of extended operation. The Aging Management Programs and activities described herein may not exist as discrete programs at PINGP. In many cases they exist as a compilation of various implementing documents. The program summaries provided should be interpreted as summaries of activities to be performed to manage aging, and not as specific commitments to maintain unique programs with the specific titles and content listed.

The Aging Management Programs and activities in this appendix rely on the Quality Assurance Program for the elements of corrective actions, confirmation process, and administrative controls. The Quality Assurance Program and associated procedures, review and approval processes, and administrative controls are implemented in accordance with the requirements of the Quality Assurance Topical Report and 10 CFR 50, Appendix B. The corrective actions and administrative controls for both safety related and non-safety related systems, structures and components are accomplished per the existing Corrective Action

Program and PINGP administrative control program, and are applicable to all Aging Management Programs and activities that will be required during the period of extended operation. The confirmation process is part of the Corrective Action Program and includes reviews to assure that corrective actions are adequate, that they are adequately tracked and reported, and that corrective action effectiveness is reviewed. Any follow-up actions required by the confirmation process are documented in accordance with the Corrective Action Program. The corrective actions, confirmation process, and administrative controls of the Quality Assurance Program are applicable to all Aging Management Programs and activities required during the period of extended operation.

A2.1 10 CFR Part 50, Appendix J Program

The 10 CFR Part 50, Appendix J Program provides for containment system examinations and leakage testing in accordance with 10 CFR 50, Appendix J, Option B. The program incorporates guidance of NRC Regulatory Guide 1.163 and Nuclear Energy Institute NEI 94-01. Containment leak rate tests are performed to assure that leakage through the primary reactor containment, and systems and components penetrating primary containment, do not exceed allowable leakage rate values specified in the Technical Specifications. Periodic surveillance of reactor containment penetrations and isolation valves is performed so that proper maintenance and repairs are made during the service life of the containment.

A2.2 Aboveground Steel Tanks Program

The Aboveground Steel Tanks Program ensures the integrity of carbon steel tanks in scope of License Renewal that rest on soil or concrete such that the bottom exterior surface is potentially susceptible to corrosion due to the ingress of water, while being inaccessible for visual inspection. The program provides for visual inspections of tank external surfaces down to their contact with the foundation, including any sealants/caulking at the foundation interfaces. It also provides for ultrasonic bottom thickness measurements from inside the tank to determine if significant thinning is occurring on the inaccessible bottom surface of the tank. External tank surfaces are coated with protective paint or coatings to prevent corrosion.

For insulated outdoor tanks, the inspections cover the exterior surface of the insulation, and specifically look for damage to insulation or its outer covering that could permit water ingress, and for discoloration or other evidence that the insulation has been wetted. If insulation damage or wetting is identified, insulation will be removed at the affected location to permit direct inspection of the external tank surface. In addition, sample sections of insulation near the bottom of each insulated outdoor tank (i.e., locations with the highest potential for wetted insulation) will be removed periodically to permit direct inspection of the tank exterior.

This program will be implemented prior to the period of extended operation.

A2.3 ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program

The ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program provides for condition monitoring of ASME Class 1, 2 and 3 pressure-retaining components, their welded integral attachments and bolting. The program is implemented in accordance with the requirements of 10 CFR 50.55a, with specified limitations, modifications and NRC-approved alternatives, and applicable provisions of the ASME Boiler and Pressure Vessel Code, Section XI (ASME Section XI). The program includes periodic visual, surface, and/or volumetric examinations, and leakage tests. The program also provides component repair and replacement requirements in accordance with ASME Section XI.

The provisions of ASME Section XI are augmented by additional inspections to detect general and pitting corrosion on the shell to transition cone weld of the Westinghouse Model 51 steam generators in Unit 2. Westinghouse Model 51 steam generators have a high stress region at the shell to transition cone weld, and corrosion of the steam generator shell is known to exist.

The program is updated periodically as required by 10 CFR 50.55a.

A2.4 ASME Section XI, Subsection IWE Program

The ASME Section XI, Subsection IWE Program provides for condition monitoring of Class MC pressure-retaining components and their related items, including integral attachments, seals, gaskets, moisture barriers, and pressure-retaining bolting. The program is implemented in accordance with the requirements of 10 CFR 50.55a, with specified limitations, modifications and NRC-approved alternatives, and applicable provisions of the ASME Boiler and Pressure Vessel Code, Section XI, Subsection IWE. The program monitors for aging effects by performing visual examinations of the Class MC components and their related items. Visual or volumetric examinations, as applicable, are performed on components that require augmented examination.

The program is updated periodically as required by 10 CFR 50.55a.

A2.5 ASME Section XI, Subsection IWF Program

The ASME Section XI, Subsection IWF Program provides for condition monitoring of Class 1, 2 and 3 component supports. The program is implemented in accordance with the requirements of 10 CFR 50.55a, with specified limitations, modifications and NRC-approved alternatives, and the applicable provisions of the ASME Boiler and Pressure Vessel Code, Section XI, Subsection IWF. The program manages aging effects by performing periodic visual examinations of supports for Class 1, 2, and 3 piping and components.

The program is updated periodically as required by 10 CFR 50.55a.

A2.6 Bolting Integrity Program

The Bolting Integrity Program manages the aging affects associated with closure bolting in mechanical components and with structural bolting in the scope of License Renewal through periodic inspection, material selection, thread lubricant control, assembly and torque requirements, and repair and replacement requirements. Inspections of bolting within the scope of the Bolting Integrity Program are conducted under the following programs:

- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program,
- ASME Section XI, Subsection IWE Program,
- ASME Section XI, Subsection IWF Program,
- Buried Piping and Tanks Inspection Program,
- External Surfaces Monitoring Program,
- RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program, and
- Structures Monitoring Program.

A2.7 Boric Acid Corrosion Program

The Boric Acid Corrosion Program is a condition monitoring program developed in accordance with NRC Generic Letter 88-05, “Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants.” The program performs periodic visual examinations of the reactor coolant pressure boundary and other systems containing borated water for evidence of leakage and corrosion. Adjacent structures, components (including electrical), and supports are also examined for boric acid accumulation and corrosion. The program includes evaluations, assessments, and corrective actions for the observed leakage sources and any affected structures and components.

A2.8 Buried Piping and Tanks Inspection Program

The Buried Piping and Tanks Inspection Program manages loss of material on the external surfaces of carbon steel and cast iron components that are buried in soil or sand. As a preventive measure, buried pipe is coated and wrapped prior to initial installation in accordance with standard industry practices to prevent/mitigate corrosion. The program performs visual inspections following excavation of external surfaces of buried components (e.g., piping, tanks, bolting) for evidence of coating damage and degradation of the underlying carbon steel and cast iron. If no evidence of damage to the coating or wrapping is detected, then the coating or wrapping will not be removed for further inspection. The periodicity of these inspections will be based on opportunities for inspection such as scheduled maintenance work, with at least one inspection occurring within ten years prior to the period of extended operation, and one in each ten-year period thereafter. If an opportunity for inspection does not occur within a ten-year period, then a focused inspection of a sample component will be performed prior to the end of that period.

This program will be implemented prior to the period of extended operation.

A2.9 Closed-Cycle Cooling Water System Program

The Closed-Cycle Cooling Water System Program is both a preventive and condition monitoring program that is based on the Electric Power Research Institute (EPRI) closed cooling water chemistry guidelines. The program includes preventive measures (maintenance of system corrosion inhibitor concentrations) to minimize corrosion, heat transfer degradation, and stress corrosion cracking; and testing and inspection to monitor the effects of corrosion, heat transfer degradation, and stress corrosion cracking on the intended functions of the components. In addition, cleaning and inspection of heat exchangers are performed periodically along with pump and heat exchanger performance/functional testing.

A2.10 Compressed Air Monitoring Program

The Compressed Air Monitoring Program is a condition monitoring program that manages the effects of corrosion and the presence of unacceptable levels of contaminants for the Station and Instrument Air System. The program conducts periodic air quality sampling, inspections, component functional testing, and leakage testing. Additionally, preventive maintenance is performed at regular intervals to assure system components continue to operate reliably, thereby assuring that quality air is supplied to plant equipment. This program implements the PINGP commitments made in response to NRC Generic Letter 88-14, “Instrument Air Supply System Problems Affecting Safety-Related Equipment.”

A2.11 Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program

The Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program conducts a one-time test of a representative sample of electrical cable connections (metallic portions) to confirm the absence of aging effects (loose connections). Cable connections terminating within an active or passive device/enclosure from external sources are within the scope of this program. Cable/wiring connections terminating within an active or passive device/enclosure from internal sources are not within the scope of this program. The representative sample includes connections of various voltage applications (medium and low voltage), circuit loadings and locations (high temperature, high humidity, vibration, etc.).

This program will be completed prior to the period of extended operation.

A2.12 Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program

The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program manages the aging effect reduced insulation resistance on insulated electrical cables and connections (including splices, terminations, fuse blocks, connectors, and insulation portions of electrical penetrations) installed in adverse localized environments (e.g., high temperature, radiation and/or moisture levels significantly more severe than design service conditions) to ensure cable and connection insulation integrity is maintained throughout the period of extended operation. The program conducts periodic visual inspections on a representative sample of accessible cables and connections in identified adverse localized environments, to confirm insulation integrity. Inspections are performed at least once every ten years, with the first inspection completed before the period of extended operation.

This program will be implemented prior to the period of extended operation.

A2.13 Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program

The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program manages the aging effect of reduced insulation resistance on non-EQ, sensitive (high voltage, low signal) instrumentation circuit cables and connections, that are exposed to adverse ambient or adverse localized environments, to maintain electrical circuit integrity. An adverse localized environment is a condition of high temperature, radiation and/or moisture that is significantly more severe than the specified service environment for the cable. This program includes either periodic review of surveillance data, or testing of cables and connections, for high-range-radiation and neutron flux monitoring instrumentation that is sensitive to a reduction in cable insulation resistance. The first reviews/tests are completed before the period of extended operation, and are conducted at least once every ten years thereafter.

This program will be implemented prior to the period of extended operation.

A2.14 External Surfaces Monitoring Program

The External Surfaces Monitoring Program is a condition monitoring program that implements inspections and walkdowns of systems and components within the scope of the program. Periodic system inspections and walkdowns are conducted to visually inspect accessible external surfaces of piping, piping components, ducting, and other metallic and non-metallic components for aging degradation. The program is also credited with managing aging effects of internal surfaces for situations in which the external surface is subject to the same environment or stressor as the internal surface, such that the external surface condition is representative of internal surface condition.

A2.15 Fire Protection Program

The Fire Protection Program is a condition monitoring program which consists of fire barrier inspection activities, diesel-driven fire pump inspection activities and halon/carbon dioxide (CO_2) fire suppression system inspection activities. The fire barrier inspection activities include periodic visual inspection of fire barrier penetration seals, fire barrier walls, ceilings, and floors, and periodic inspection and functional testing of all fire-rated doors that perform a fire barrier function to ensure that their operability and intended functions are maintained. The diesel-driven fire pump inspection activities include periodic pump performance testing to ensure that the fuel supply line can perform its intended function. The halon/CO_2 fire suppression system inspection activities include both periodic inspection and functional testing of the halon/CO_2 fire suppression system to manage the aging effects and degradation that may affect the intended function and performance of the system.

A2.16 Fire Water System Program

The Fire Water System Program is a condition monitoring program that conducts inspections and performance tests of water-based fire protection system components such as sprinklers, nozzles, fittings, valves, hydrants (including hose and gaskets), hose stations, standpipes, and aboveground and underground piping and components. Inspection and testing are performed in accordance with applicable National Fire Protection Association (NFPA) codes and standards, and NRC commitments. Fire protection system piping is subject to periodic flushing and wall thickness evaluations to ensure that corrosion, microbiologically-influenced corrosion (MIC), and fouling are managed such that the system function is maintained. Additionally, internal portions of the fire water system are visually inspected when disassembled for maintenance. Prior to exceeding the 50-year service life, sprinkler heads will be replaced or be subject to representative sample testing.

A2.17 Flow-Accelerated Corrosion Program

The Flow-Accelerated Corrosion (FAC) Program is a condition monitoring program based on Electric Power Research Institute (EPRI) guidelines for an effective FAC program. The program manages loss of material due to FAC in piping and components containing high-energy single phase or two phase fluids. The program includes (a) conducting an analysis to determine critical locations, (b) performing baseline inspections to determine the extent of thinning at these locations, and (c) performing follow-up inspections to confirm predictions of the rate of thinning, or repairing or replacing components as necessary. This program implements the PINGP response to NRC Generic Letter 89-08.

A2.18 Flux Thimble Tube Inspection Program

The Flux Thimble Tube Inspection Program is a condition monitoring program that manages loss of material due to wear for in-core instrument thimble tubes. The program implements periodic eddy current testing of thimble tubes for thinning of the flux thimble tube wall due to flow-induced fretting. The program also provides for evaluation and trending of inspection results and appropriate corrective actions. This program implements the PINGP commitments made in response to NRC Bulletin 88-09, “Thimble Tube Thinning in Westinghouse Reactors.”

A2.19 Fuel Oil Chemistry Program

The Fuel Oil Chemistry Program manages the aging effects of loss of material and cracking on internal surfaces of the diesel fuel oil system piping, piping components and tanks by minimizing the potential for a corrosive environment, and by verifying that the actions taken to mitigate corrosion are effective. The program includes: (1) periodic sampling and testing of stored fuel oil and testing of new fuel oil in accordance with plant Technical Specifications and selected industry standards to confirm water, sediment and contaminants remain below limits of concern for corrosion to occur; (2) periodic testing of fuel oil storage tanks for the presence of water; (3) periodic integrity testing of underground storage tanks and external visual inspections of aboveground storage tanks to confirm leakage is not occurring; and, (4) one-time inspections of selected tank bottom and piping locations, using ultrasonic testing, to be performed prior to the period of extended operation.

A2.20 Fuse Holders Program

The Fuse Holders Program is a condition monitoring program that implements periodic visual inspections and tests of fuse holders in scope of License Renewal, located in passive enclosures and assemblies, and exposed to adverse localized environments. A localized environment is adverse if it promotes loose connections from clip relaxation/fatigue (i.e., ohmic heating, thermal cycling or electrical transients, mechanical fatigue caused by frequent removal/replacement of the fuse, or vibration), or if it exposes the fuse holder to adverse levels of chemical contamination or moisture that would promote corrosion and oxidation of the metallic fuse clips.

Fuse holders determined to be operating in an adverse localized environment will be visually inspected and tested at least once every 10 years, with the first inspections and tests completed before the period of extended operation. The specific type of test performed will be capable of detecting deterioration of metallic clamps of the fuse holders, such as thermography, contact resistance testing, or other appropriate test method.

This program will be implemented prior to the period of extended operation.

A2.21 Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program

The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program performs periodic tests to provide an indication of the condition of the conductor insulation for medium voltage cables in scope of License Renewal exposed to long periods of high moisture (greater than a few days at a time) and subjected to voltage stress (energized greater than 25 percent of the time). This program includes underground cables (direct buried or in underground ducts) not designed for wet environments. Insulation testing for the affected cables is performed at least once every 10 years, with the first tests completed prior to the period of extended operation.

The program also includes periodic inspections of the applicable underground raceway manhole for the accumulation of water and draining water, if necessary. Manhole inspections are performed at least once every two years, with the first inspection completed before the period of extended operation.

This program will be implemented prior to the period of extended operation.

A2.22 Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program is a condition monitoring program that performs visual inspections of the internal surfaces of mechanical components within the scope of License Renewal not covered by other aging management programs. The internal inspections are performed during scheduled preventive and corrective maintenance activities, or during other routinely scheduled tasks such as surveillance procedures, when internal surfaces are made accessible for inspections. The program inspections are performed to provide assurance that existing environmental conditions are not resulting in degradation that could result in a loss of component intended functions.

This program will be implemented prior to the period of extended operation.

A2.23 Inspection of Overhead Heavy Load and LIght Load (Related to Refueling) Handling Systems Program

The Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program implements condition monitoring activities that ensure structural components of heavy load handling systems and light load handling systems related to refueling within the scope of License Renewal are capable of sustaining their rated loads for the period of extended operation. The load handling components in scope of License Renewal are overhead heavy load handling components subject to the requirements of NUREG-0612, and light load handling components associated with refueling activities. The program provides for periodic visual inspections of structural components, including crane rails, structural girders, beams, special lifting devices, and welded and bolted connections.

A2.24 Lubricating Oil Analysis Program

The Lubricating Oil Analysis Program obtains and analyzes lubricating and hydraulic oil samples from plant equipment to ensure that oil quality is maintained within acceptable limits to preserve an operating environment that is not conducive to loss of material, cracking, or heat transfer degradation. Program activities include periodic oil sampling, analysis, and evaluation and trending of results.

A2.25 Masonry Wall Program

The Masonry Wall Program is a condition monitoring program that performs periodic visual inspections of masonry walls in proximity to, or with attachments to, safety related equipment. The program is based on guidance provided in NRC IE Bulletin 80-11, “Masonry Wall Design,” and NRC Information Notice 87-67, “Lessons Learned from Regional Inspections of Licensee Actions in Response to IE Bulletin 80-11.” The Masonry Wall Program assures that the evaluation basis established for each masonry wall within the scope of License Renewal remains valid.

A2.26 Metal-Enclosed Bus Program

The Metal-Enclosed Bus Program is a condition monitoring program that inspects representative samples of the interiors of non-segregated 4160V phase bus between station offsite source auxiliary transformers and plant buses. Internal visual inspection is performed to observe signs of aging to the bus insulation materials (such as cracking and discoloration), evidence of loose connections, and signs of moisture and debris intrusion. Internal bus supports are visually inspected for structural integrity and signs of cracks. The inspection may include thermography and/or electrical resistance testing to ensure the integrity of bus connections. The interior visual inspection is conducted at least once every five years, or, if conducted with thermography or electrical resistance testing, at least once every ten years. The first inspections and/or tests are completed before the period of extended operation.

This program will be implemented prior to the period of extended operation.

A2.27 Nickel-Alloy Nozzles and Penetrations Program

For the Nickel-Alloy Nozzles and Penetrations Program, PINGP commits to the following activities for managing the aging of nickel-alloy components susceptible to primary water stress corrosion cracking:

1. comply with applicable NRC orders, and

2. implement applicable NRC Bulletins, Generic Letters, and staff-accepted industry guidelines.

A2.28 Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program

The Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program is a condition monitoring program that implements the requirements of the NRC First Revised Order EA-03-009, “Issue of Order Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors,” dated February 20, 2004 (Order). This program manages the aging effects of cracking due to primary water stress corrosion cracking of the nickel-alloy vessel head penetration nozzles welded to the upper reactor vessel head. In addition, the program monitors the upper reactor vessel head surface and the region above the reactor vessel head for boric acid leakage.

This program is a mandated augmented inservice inspection program that supplements the leakage tests and visual VT-2 examinations required by ASME Section XI, Table IWB-2500-1, Examination Category B-P. The program incorporates the susceptibility ranking of the upper vessel head penetration nozzles to primary water stress corrosion cracking, and the required process for establishing the inspection methods and inspection frequencies in accordance with the susceptibility ranking, as required by the Order, as amended.

A2.29 One-Time Inspection Program

The One-Time Inspection Program provides additional assurance, through sampling inspections using nondestructive examination (NDE) techniques, that aging is not occurring or that the rate of degradation is so insignificant that additional aging management actions are not warranted. The program includes measures to verify the effectiveness of other aging management programs, such as the Water Chemistry Program, to mitigate aging effects. In other cases, this program confirms that a separate aging management program is not warranted when significant aging is not expected to occur. If aging effects are identified that could adversely impact an intended function prior to the end of the period of extended operation, additional actions will be taken to correct the condition, perform additional inspections, and/or perform periodic inspections as needed.

The program elements include: (a) determination of the sample size based on an assessment of materials of fabrication, environment, plausible aging effects, and operating experience; (b) identification of inspection locations in the system, component, or structure based on the aging effect; (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect that is being examined; and (d) evaluation of the need for follow-up examination if degradation is identified that could jeopardize an intended function prior to the end of the period of extended operation. The program relies on the results of inspections performed within the 10-year period preceding the period of extended operation.

This program will be completed prior to the period of extended operation.

A2.30 One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program

The One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program is a condition monitoring program that provides additional assurance that aging of Class 1 small-bore piping either is not occurring or is insignificant, such that a new plant-specific aging management program is not warranted. The program inspects for the presence of cracking by performing one-time volumetric examinations on a sample of butt welds in Class 1 piping (including pipes, fittings, and branch connections) less than 4-inch nominal pipe size. The one-time inspections are performed at locations that are determined to be potentially susceptible to cracking based upon the methodology of the site-specific, NRC-approved, Risk Informed Inservice Inspection Program.

This program will be completed prior to the period of extended operation.

A2.31 Open-Cycle Cooling Water System Program

The Open-Cycle Cooling Water (OCCW) System Program implements the commitments made in the PINGP response to NRC Generic Letter 89-13, “Service Water System Problems Affecting Safety-Related Equipment,” to ensure that the effects of aging in OCCW systems, and in components serviced by the OCCW systems, will be managed for the period of extended operation. This program manages aging effects associated with metallic components exposed to a raw water environment. These aging effects are due to corrosion, erosion, and fouling (including silting and coating failure). The program includes (a) surveillance and control of fouling, (b) tests to verify heat transfer capabilities, and (c) routine inspection and maintenance activities.

A2.32 PWR Vessel Internals Program

For the PWR Vessel Internals Program, PINGP commits to the following activities for managing the aging of reactor vessel internals components:

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.

A2.33 Reactor Head Closure Studs Program

The Reactor Head Closure Studs Program implements inservice inspection of reactor vessel head closure studs. The program is implemented in accordance with the requirements of 10 CFR 50.55a, with specified limitations, modifications, and NRC-approved alternatives, and the applicable requirements of the ASME Boiler and Pressure Vessel Code, Section XI. The program includes preventive measures to mitigate cracking including proper material selection, avoiding the use of metal-plated stud bolting, and controlling the use of surface treatments and lubricants.

This program is updated periodically as required by 10 CFR 50.55a.

A2.34 Reactor Vessel Surveillance Program

The Reactor Vessel Surveillance Program manages the reduction of fracture toughness due to neutron embrittlement of the low alloy steel reactor vessels. The program ensures that reactor vessel materials meet the requirements of 10 CFR 50.60 for fracture prevention and 10 CFR 50.61 for Pressurized Thermal Shock (PTS). This program includes surveillance capsule removal and specimen mechanical testing/evaluation, radiation analysis, development of pressure-temperature operating limits, and determination of low-temperature overpressure protection (LTOP) setpoints. Withdrawn untested capsules placed in storage are maintained for future insertion. Monitoring methods are in accordance with 10 CFR 50, Appendix H. Fracture toughness is in accordance with 10 CFR 50, Appendix G. In addition, the program complies with Regulatory Guide 1.99 and ASTM E-185.

The Reactor Vessel Surveillance Program manages updates of pressure-temperature operating limitations and the surveillance specimen withdrawal schedule, as needed, consistent with plant Technical Specifications, the Pressure and Temperature Limits Report, and 10 CFR 50.60 and 10 CFR 50, Appendix H.

A2.35 RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program

The RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program manages aging effects in water-control structures and components, including bolting, through periodic visual inspections and hydrographic surveys. Program elements include guidance on inspection scope, aids to facilitate the inspection process, criteria used to evaluate the inspection results, guidance on inspection frequency, and documentation requirements. Structures included within the scope of the program are the Screenhouse, Emergency Cooling Water Intake (crib), Intake Canal, and Approach Canal.

This program does not constitute a commitment to the guidance of NRC Regulatory Guide 1.127. RG 1.127 focuses on dams, reservoirs behind those dams, and dam safety and outlet works that deliver cooling water from reservoirs and spill excess water to prevent dam overtopping. These components are not within the scope of License Renewal at PINGP. However, this program considers the guidance in NRC RG 1.127 and ACI 349.3R-96 if it is necessary to evaluate degradation mechanisms and questionable concrete conditions.

A2.36 Selective Leaching of Materials Program

The Selective Leaching of Materials Program performs a one-time visual inspection in conjunction with a hardness measurement, or other suitable detection technique, of selected components in scope of License Renewal made of cast iron, copper alloys >15% zinc, and copper-nickel in environments conducive to selective leaching. Through inspections of representative samples, the program will determine if selective leaching is occurring and, if found, whether the aging mechanism will affect the ability of the component to perform its intended function.

This program will be completed prior to the period of extended operation.

A2.37 Steam Generator Tube Integrity Program

The Steam Generator Tube Integrity Program consists of activities that manage the aging effects cracking, denting, ligament cracking, and loss of material for steam generator tubes, tube plugs, tube repairs and various secondary side internal components. The Steam Generator Tube Integrity Program is implemented in accordance with Technical Specifications Section 5.5.8 and applicable industry guidance. The program manages aging effects through a balance of prevention, inspection, evaluation, repair, and leakage monitoring. Eddy current testing is used to detect steam generator tube flaws and degradation. Visual examinations are conducted on tube plugs, sleeve plugs, and sleeves as necessary. In addition, visual inspections are performed to identify degradation of secondary side steam generator internal components.

A2.38 Structures Monitoring Program

The Structures Monitoring Program is a condition monitoring program that manages aging effects in structures, supports and structural components, including bolting, within the scope of License Renewal. The program performs periodic visual inspections to monitor the condition of structures, supports and components, including bolting, against established acceptance criteria to ensure that degradation is identified, evaluated, and, when necessary, corrected such that there is no loss of intended function.

A2.39 Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program

The Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program manages loss of fracture toughness due to thermal aging embrittlement of CASS components, other than pump casings and valve bodies, that are exposed to reactor coolant operating temperatures. The program determines the susceptibility of CASS components to loss of fracture toughness due to thermal aging embrittlement based on the casting method, molybdenum content, and percent ferrite. For components determined to be potentially susceptible to thermal aging embrittlement, the program provides for enhanced volumetric examinations or component-specific flaw tolerance evaluations. The program augments the PINGP ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program.

This program will be implemented prior to the period of extended operation.

A2.40 Water Chemistry Program

The Water Chemistry Program manages aging effects by controlling the internal environment of systems and components. The program mitigates corrosion, stress corrosion cracking and heat transfer degradation due to fouling in the primary, auxiliary (borated), and secondary water systems included in the scope of the program. Aging effects are managed by controlling concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. This program implements the EPRI PWR primary and secondary water chemistry guidelines.

A3.0 Summary Descriptions of Time-Limited Aging Analyses Aging Management Programs

A3.1 Environmental Qualification (EQ) of Electrical Components Program

The Environmental Qualification (EQ) of Electrical Components Program (EQ Program) implements the requirements of 10 CFR 50.49 (as further defined and clarified by the DOR Guidelines and NUREG-0588), and the guidance of Regulatory Guide 1.89, “Environmental Qualification of Certain Electrical Equipment Important to Safety for Nuclear Plants,” Revision 1. The EQ Program manages component thermal, radiation, and cyclical aging through the use of aging evaluations based on 10 CFR 50.49(f) qualification methods to assure that certain electrical components located in harsh plant environments are qualified to perform their safety functions in those harsh environments. As required by 10 CFR 50.49, EQ components not qualified for the license term are to be refurbished or replaced, or have their qualification extended, prior to reaching the aging limits established in the evaluation.

A3.2 Metal Fatigue of Reactor Coolant Pressure Boundary Program

The Metal Fatigue of Reactor Coolant Pressure Boundary Program monitors the thermal and pressure transients experienced by selected reactor coolant system pressure boundary components to ensure those components remain within their design fatigue usage limits. The program uses the systematic counting of plant transient cycles to ensure that design assumptions for cumulative transient cycles are not exceeded. The program also uses computerized cycle-based or stress-based monitoring methods to track fatigue usage in critical high-usage components. Locations monitored by the program include the six component locations for older vintage Westinghouse plants identified in NUREG/CR-6260 as representative locations for the effect of reactor coolant environment on component fatigue life.

The program ensures that cumulative fatigue usage of each affected primary system location is evaluated, and corrective actions taken if necessary, when the number or magnitude of accumulated thermal and pressure transients approach or exceed design cycle assumptions, or when the projected fatigue usage approaches a value of 1.0, during the life of the plant including the period of extended operation.

A4.0 Summary Descriptions of Evaluations of Time-Limited Aging Analyses

In accordance with 10 CFR 54.21(c), an application for a renewed operating license requires an evaluation of Time-Limited Aging Analyses (TLAAs) for the period of extended operation. The following TLAAs were identified and evaluated to meet this requirement. A summary of the results of each evaluation is provided for each TLAA. These summaries will be incorporated into appropriate locations in the USAR.

A4.1 **Reactor Vessel Neutron Embrittlement**

The PINGP analyses that address the effects of neutron irradiation embrittlement of the reactor vessels are TLAAs for License Renewal. The analyses have been updated to address twenty additional years of operation during the period of extended operation. For the purpose of projecting fluence and evaluating reactor vessel fracture toughness at 60 years, 54 EFPY is assumed to be the number of effective full power years of operation at the end of the period of extended operation.

Reactor Vessel Fluence

The neutron fluence experienced by critical vessel locations has been projected to the end of the period of extended operation using NRC-approved methodology. The fluence projections were based on operational data through Cycle 24 for Unit 1 and Cycle 23 for Unit 2 at the licensed power level of 1650 MWt. The projections also accounted for a planned thermal power level increase from the Measurement Uncertainty Recapture - Power Uprate (MUR-PU) during Cycle 25. The peak fluence at the clad/base metal interface at 54 EFPY is 5.162E19 n/cm^2 for Unit 1 and 5.196E19 n/cm^2 for Unit 2.

Charpy Upper-Shelf Energy

Appendix G of 10 CFR 50 requires that reactor vessel beltline materials “... must maintain Charpy upper-shelf energy throughout the life of the vessel of no less than 50 ft-lb….”

Fluence values for 54 EFPY at the ¼T location were obtained by applying Equation (3) of Regulatory Guide 1.99 based on a vessel thickness of 6.692 inches. Upper-shelf energies for beltline forgings and welds at 54 EFPY for PINGP Units 1 and 2 are all projected to be above 50 ft-lb.

Pressurized Thermal Shock

10 CFR 50.61(b)(1) provides rules for the protection of pressurized water reactors against pressurized thermal shock. Licensees are required to assess the projected values of reference temperature whenever a significant change occurs in the projected values of the reference temperature for pressurized thermal shock (RT_{PTS}), or upon request for a change in the expiration date for the facility operating license. For License Renewal, RT_{PTS} values were calculated for the projected fluence values at 54 effective full power years (EFPY).

10 CFR 50.61(b)(2) establishes screening criteria for RT_{PTS} of 270^{o}F for plates, forgings, and axial welds, and 300^{o}F for circumferential welds. The values of RT_{PTS} at 54 EFPY for PINGP Units 1 and 2 are all within the established screening criteria. The limiting beltline material for PINGP Unit 1 is the nozzle shell forging B to intermediate shell forging C circumferential weld 2269, with an RT_{PTS} of 157^{o}F at 54 EFPY. The limiting beltline material for PINGP Unit 2 is the nozzle shell forging B to intermediate shell forging C circumferential weld 1752, with an RT_{PTS} of 136^{o}F at 54 EFPY.

Pressure-Temperature Limits

10 CFR 50, Appendix G requires reactor pressure vessel (RPV) thermal limit analyses to determine operating pressure-temperature (P-T) limits for boltup, hydrotest, pressure tests, and normal operating and anticipated operational occurrences. P-T limit curves are developed to satisfy the requirements of 10 CFR 50, Appendix G. Irradiation embrittlement effects are included in the core beltline P-T curve limits.

The PINGP Pressure and Temperature Limits Report contains the P-T limit curves. The P-T limit curves will be updated by the Reactor Vessel Surveillance Program, when required, in accordance with Appendix G of 10 CFR 50.

Low-Temperature Overpressure Protection Analyses

Each time the P-T limit curves are revised, the Low-Temperature Overpressure Protection System (OPPS) limits must be re-evaluated to ensure its functional requirements continue to be met. Calculation of new low-temperature overpressure protection limits is performed by the Reactor Vessel Surveillance Program as part of the development of the pressure-temperature limit curves.

A4.2 Metal Fatigue

Fatigue is an age-related degradation mechanism caused by cyclic stressing of a component by either mechanical or thermal stresses. Fatigue analyses for Class 1 and selected non-Class 1 mechanical components are TLAAs for License Renewal if they meet all six elements of the definition in 10 CFR 54.3(a). Analyses that are based on a number of cycles estimated for the original 40-year license term were considered to have met criterion 54.3(a)(3).

The fatigue evaluations reported in this section are based on normal, upset, and test design transients defined in component design specifications and the USAR. Design basis analyses, where available, were used with the identified aging management program(s), to provide assurance that components will remain within their fatigue usage limits (cumulative usage factor less than 1.0) through the period of extended operation. The design transients and analyses results were also reviewed to assess the impact of the planned Measurement Uncertainty Recapture-Power Uprate (MUR-PU). The review concluded that the impact of the planned MUR-PU on fatigue usage would be very small, and implementation of the MUR-PU in itself would not result in any component reaching a fatigue usage limit during the period of extended operation, or requiring aging management strategies beyond those already discussed.

For purposes of the License Renewal fatigue evaluations, the PINGP Class 1 boundary includes components within the ASME Section XI, Subsection IWB inspection boundary and the steam generator items designed to ASME Section III, Class A or Class 1.

Class 1 and non-Class 1 components determined to be potentially susceptible to fatigue damage and fatigue flaw growth were reviewed for TLAAs and evaluated where applicable. The metal fatigue TLAA evaluation results for Class 1 and non-Class 1 components are summarized below.

Class 1 Metal Fatigue

Class 1 components evaluated for fatigue include the reactor pressure vessels, reactor vessel internals, pressurizers, steam generators, reactor coolant pumps, control rod drive mechanism housings, and Class 1 piping and in-line components. The fatigue analyses calculate a cumulative usage factor (CUF) for a selected component or subassembly based on a specified number of design transient cycles for that component. Design transient cycle assumptions for PINGP Class 1 components are listed in USAR Section 4.1.4 and Table 4.1-8. For the License Renewal evaluations, the numbers of design transient cycles accumulated through September 30, 2006 were projected forward to determine the numbers of cycles expected at the end of 60 years of operation. The numbers of design transient cycles projected to be accumulated at 60 years were less than the numbers of cycles accounted for in the design fatigue analyses for 40 years. Therefore, the original number of design transient cycles will remain valid through the period of extended operation. As a result, with the exception of the reactor vessel internals baffle bolts, the design fatigue analyses of Class 1 components based on those transients will remain valid for the period of extended operation.

In the case of the Reactor Vessel Internals, the fatigue assessment concluded that the limiting items in the baffle plate assembly, the baffle bolts, are not capable of sustaining the full set of plant loading at 5% per minute and plant unloading at 5% per minute design cycles. The total number of allowable cycles of the plant loading and unloading design transient were reassessed to determine a reduced number of cycles that would limit the total baffle bolt CUF to less than 1.0. The total allowable number of cycles was determined to be 1835 compared to the original design value of 18,300. The relevant transients, plant loading and unloading at 5% per minute, are projected to occur only 970 times over the 60-year operating period, well below the reduced cycle limit for the baffle bolts of 1835. USAR Table 4.1-8 is being revised to impose this additional cyclic limit for baffle bolt fatigue. With this reduced cyclic limit, the TLAA for baffle bolts has been projected through the period of extended operation.

Non-Class 1 Metal Fatigue

Non-Class 1 mechanical components that are within the scope of License Renewal and subject to fatigue evaluation fell into two major categories: (1) piping and in-line components (tubing, piping, traps, thermowells, valve bodies, etc.), or (2) non-piping components (tanks, vessels, heat exchangers, pump casings, turbine casings, etc.).

For non-Class 1 piping and in-line components identified as potentially susceptible to cracking due to fatigue, a review of system operating characteristics was conducted to determine the approximate frequency of any significant thermal cycling. If the number of equivalent full temperature cycles experienced in 60 years is below the limit used for the original design (typically 7000 cycles for a stress range reduction factor of 1.0), the component fatigue life is suitable for extended operation. If the number of equivalent full temperature cycles exceed the limit, the individual stress calculations require evaluation. No PINGP systems were projected to exceed 7000 full temperature cycles at 60 years. Therefore, the TLAAs for non-Class 1 piping and in-line components remain valid for the period of extended operation.

The only non-Class 1, non-piping components identified with fatigue-related TLAAs were the auxiliary heat exchangers (sample heat exchangers, residual heat exchangers, regenerative heat exchangers, letdown heat exchangers, and excess letdown heat exchangers). The design transients identified in the equipment specifications were determined to be consistent with the design transients defined for 40 years in Table 4.1-8 of the USAR. As described above, the numbers of design transient cycles projected to be accumulated at 60 years were less than the numbers of cycles considered in the original 40-year designs. Therefore, the TLAAs for the subject auxiliary heat exchangers will remain valid during the period of extended operation.

Environmental Effects on Fatigue

Generic Safety Issue 190 addressed the issue that certain environmental effects (such as temperature and dissolved oxygen content) in the primary systems of light water reactors could result in greater susceptibility to fatigue than would be predicted by fatigue analyses based on the ASME Section III design fatigue curves. The ASME design fatigue curves were based on laboratory tests in air and at low temperatures. Although the fatigue failure curves derived from laboratory tests were adjusted to account for effects such as data scatter, size effect, and surface finish, these adjustments may not have been sufficient to account for actual plant operating environments.

As reported in SECY-95-245, the NRC concluded that no immediate staff or licensee action was necessary to deal with environmentally-assisted fatigue, and a backfit of the environmental fatigue data to operating plants was not required. However, the NRC also concluded that, because metal fatigue effects increase with service life, environmentally-assisted fatigue should be evaluated for any proposed extended period of operation for License Renewal.

NUREG/CR-6260 applied the fatigue design curves that incorporated environmental effects to several plants and identified locations of interest for consideration of environmental effects. Section 5.5 of NUREG/CR-6260 identified certain component locations to evaluate in older vintage Westinghouse plants, such as PINGP. The corresponding PINGP locations are as follows:

- Reactor vessel shell and lower head
- Reactor vessel inlet and outlet nozzles
- Pressurizer surge line hot leg nozzle safe end
- RCS piping charging system nozzle
- RCS piping safety injection accumulator nozzle
- RHR Class 1 piping tee

For License Renewal the effects of reactor water environment on fatigue were evaluated for the equivalent PINGP locations using the methodology of NUREG/CR-6260. Environmentally-adjusted cumulative usage factors (CUFs) for 60 years were calculated. The environmentally-adjusted CUFs for all locations were projected to be less than 1.0 through the period of extended operation.

A4.3 Environmental Qualification of Electrical Components

The Environmental Qualification of Electrical Components Program manages component thermal, radiation and cyclical aging in accordance with 10 CFR 50.49 through the use of aging evaluations based on 10 CFR 50.49(f) qualification methods. Aging evaluations for Environmentally Qualified components that specify a qualified life of at least 40 years are considered TLAAs for License Renewal.

Aging evaluations of electrical components are updated on an as-required basis to manage the effects of aging on qualified life. When qualification time limits are approached, whether during the initial 40-year license term or the period of extended operation, the Environmental Qualification of Electrical Components Program requires replacement, refurbishment or reanalysis to extend the qualification of components. Therefore, the effects of aging on the intended functions of EQ components will be adequately managed for the period of extended operation.

A4.4 Reactor Containment Vessel and Penetration Fatigue Analyses

The design specification for the Reactor Containment Vessels (RCVs) assumes 40 cycles of pressurization of the vessel from atmospheric pressure to design pressure in 40 years. Because the only time the vessel would experience a pressurization cycle would be for integrated leak rate testing that is typically performed at 10-year intervals, or during certain accident scenarios, the assumption is conservative, and will remain valid through the period of extended operation.

The design specification also assumes 200 temperature cycles between 50°F and 120°F during the life of the vessel. The operating temperature of each RCV stays relatively constant during normal plant operation as the Shield Building effectively isolates the vessel from outdoor weather, and temperature variations are only expected during plant shutdown periods. The temperature variations of the Reactor Containment Vessel can be correlated to plant heat-up and cooldown cycles over 60 years, which are shown in USAR Table 4.1-8 to be limited to 200. Therefore, this assumption will remain valid through the period of extended operation.

Hot piping penetration assemblies, including the process pipe, guard pipe, and flued heads, were designed in accordance with USAS B31.1.0, and can be considered to be subject to the cyclic operation stress range reduction factor. The stress range reduction factor begins to decrease the code allowable stress when the number of thermal cycles become greater than 7,000. The hot piping penetration thermal cycles correlate with Reactor Coolant System heatup and cooldown, and reactor trips. Current USAR allowable cycles for Reactor Coolant System heatup and cooldown and reactor trips are 200 and 400, respectively, which bound the expected number of cycles for the period of extended operation. Therefore, the numbers of applicable design transients will not exceed 7000 cycles in 60 years of plant operation, and this TLAA will remain valid through the period of extended operation.

A4.5 RCS Piping Leak-Before-Break Analyses

Leak-Before-Break (LBB) analyses, discussed in USAR Section 4.6.2.3 and Section 4.6.2.4, evaluate postulated flaw growth in piping to justify changes to the structural design bases involving protection against the effect of postulated reactor coolant pipe ruptures. The LBB evaluations use fully aged fracture toughness properties, and these analyses do not have a material property time-limited assumption. However, the predicted growth of a postulated fatigue crack over 40 years was calculated using the RCS design transients. Since the numbers of design transients accumulated in 60 years remains less than the original 40-year assumptions, these analyses will remain valid during the period of extended operation.

A4.6 Reactor Vessel Underclad Cracking

Intergranular separations (underclad cracking) in low alloy steel heat-affected zones under austenitic stainless steel weld cladding were first detected in SA-508, Class 2, reactor vessel forgings in 1970. They have been reported to exist in SA-508, Class 2, reactor vessel forgings manufactured to a coarse grain practice and clad by high-heat-input submerged arc processes. The subject of underclad cracking is addressed in USAR Section 4.2.3.4.

WCAP-15338 extended the original evaluation of underclad cracking to account for 60 years of operation under a renewed operating license. The numbers of design transient cycles assumed in the WCAP-15338 analysis have been confirmed to bound the numbers of design cycles and transients projected for 60 years of operation at PINGP. Therefore, WCAP-15338 demonstrates for PINGP that fatigue growth of the postulated flaws will be minimal over 60 years, and the presence of underclad cracks are of no concern relative to the structural integrity of the reactor vessels. The analysis of underclad cracking for PINGP remains valid for the period of extended operation.

A4.7 Reactor Coolant Pump Flywheel

As discussed in USAR Section 4.3.3, the reactor coolant pump (RCP) motors are large, vertical, squirrel cage, induction motors. The motors have flywheels to increase rotational-inertia, thus prolonging pump coastdown and retarding the decrease in coolant flow to the core in the event that pump power is lost. The flywheel is mounted on the upper end of the rotor, above the upper radial bearing and inside the motor frame. The aging effect of concern is fatigue crack initiation and growth in the flywheel bore keyway from stresses due to starting the motor.

A license amendment request was submitted in 2004 to reduce the RCP flywheel inspection frequency and scope. The request was based on WCAP-15666, “Extension of Reactor Coolant Pump Motor Flywheel Examination.” This topical report includes a stress and fracture evaluation which adequately addresses fatigue crack growth for 60 years. The NRC approved this request in License Amendments 170 (Unit 1) and 160 (Unit 2) in 2005. Therefore, the analysis of fatigue crack initiation and growth in the RCP flywheels remains valid for the period of extended operation.

A4.8 Fatigue Analysis of Cranes

Design reviews performed in response to NUREG-0612 concluded that the polar cranes, auxiliary building crane, turbine building cranes, and spent fuel crane were qualified to EOCI Specification #61, but are also in compliance with the design standards of CMAA-70, with limited exceptions. Among the criteria of CMAA-70 is a design load cycle limit of 20,000 cycles. (The Class A crane value is limiting.) PINGP has reviewed the usage of these cranes and determined that even very conservative estimates of the number of cycles to be achieved in 60 years of operation do not exceed the 20,000 cycle limit in CMAA-70. As a result, the crane design analyses will remain valid for the period of extended operation.

A4.9 Probability of Damage to Safeguards Equipment from Turbine Missiles

Fully integral turbine rotors were installed at Unit 1 in 1997 and Unit 2 in 1998. A probabilistic evaluation was completed to support the installation that included an evaluation of the probability of damage to safeguards equipment from turbine missiles. A description of the evaluation is contained in Section 12.2.7 of the PINGP USAR.

This probabilistic evaluation is a TLAA for PINGP since periodic in-service inspection frequency of the rotors is based on the requirement that the probability of missile ejection remains below $5x10^{-6}$, and failure probability is a function of time. In accordance with USAR Figure 12.2-38, a failure probability of $5x10^{-6}$ is reached at approximately 37 years after installation, or 2034 for Unit 1 and 2035 for Unit 2. This is beyond the end of the period of extended operation for Unit 1 (2033) and Unit 2 (2034). Therefore, the analysis of probability of turbine rupture due to stress corrosion and the conclusion that periodic inspections are not required remain valid for the period of extended operation.

A5.0 License Renewal Commitments

The preliminary list of commitments made in the Application for Renewed Operating Licenses for Prairie Island Nuclear Generating Plant Units 1 and 2 (LRA) has been provided in the letter transmitting the LRA to the NRC. The commitments reflect the contents of the LRA as submitted, but are considered preliminary in that the specific wording of some commitments may change, and additional commitments may be made, during the NRC review of the LRA. Any other actions discussed in the LRA should be considered intended or planned actions. These other actions are included for informational purposes but are not considered regulatory commitments.

The final commitments as submitted by NMC, and accepted by NRC, are expected to be confirmed in the NRC’s Safety Evaluation Report (SER) for the renewed operating licenses. These final commitments, as confirmed in the SER, will become effective upon NRC issuance of the renewed operating licenses. The list of final commitments will be incorporated into the USAR.

APPENDIX B

AGING MANAGEMENT PROGRAMS

APPENDIX B

Table of Contents

APPENDIX B

Table of Contents

B1.0 Introduction

B1.1 Overview

License Renewal Aging Management Program (AMP) descriptions are provided in this appendix for each program credited for managing aging effects based upon the aging management review results provided in Sections 3.1 through 3.6 of this application.

Two of the programs consist of commitments that are consistent with the program descriptions provided in NUREG-1801, Sections XI.M11 and XI.M16, and the discussions in the corresponding aging management review line items of NUREG-1801 Chapter IV.

The remaining programs are described in terms of their consistency with NUREG-1801. The ten generic program elements defined in Appendix A.1, Section A.1.2.3 of NUREG-1800 have been addressed for each AMP. Each of the new or existing AMPs described in this appendix has been evaluated for consistency with the ten program-specific element discussions in the applicable program description in NUREG-1801, Chapter X or XI. This appendix summarizes the evaluation results for each program and indicates whether the program elements are consistent with, consistent with enhancements, or consistent with exceptions, to the corresponding program described in NUREG-1801.

B1.2 Method of Discussion

For those AMPs that are consistent with, consistent with enhancements, or consistent with exceptions to the programs described in Chapters X and XI of NUREG-1801, a discussion is presented in the following form:

- **Program Description:** An abstract of the overall program form and function is provided.
- **NUREG-1801 Consistency:** A NUREG-1801 consistency statement is made about the program.
- **Exceptions to NUREG-1801:** Exceptions to the NUREG-1801 program description are outlined and a justification provided. Exceptions are PINGP program element differences from NUREG-1801 specified guidance criteria.
- **Enhancements:** Enhancements to the program are identified. Enhancements are specific changes made, or to be made, to existing programs/procedures to make the program consistent with the related NUREG-1801 AMP element. An enhancement upgrades the existing site program/procedure to provide reasonable assurance that the respective aging effect(s) will be managed for the period of extended operation. Enhancements are considered NRC commitments for existing PINGP programs. For new PINGP programs, the development and implementation of each new program is considered an NRC commitment.

- **Operating Experience:** A discussion of related Operating Experience is provided for each program.
- **Conclusion:** A conclusion section is provided to confirm NMC's conclusion that, with reasonable assurance, the AMP (with enhancements, if applicable) is or will be effective.

B1.3 Quality Assurance Program and Administrative Controls

The NMC Quality Assurance Program establishes quality assurance and administrative control requirements that meet 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants." The NMC Quality Assurance Program implements the requirements of 10 CFR 50, Appendix B, and is consistent with the summary in Appendix A.2 of NUREG-1800. The NMC Quality Assurance Program includes the elements of corrective actions, confirmation process, and administrative controls, and is applicable to the safety related and non-safety related systems, structures, and components that are subject to aging management review.

The AMPs and activities described in Appendix A and Appendix B of the LRA rely on the Quality Assurance Program for the elements of corrective actions, confirmation process, and administrative controls. The Quality Assurance Program and associated procedures, review and approval processes, and administrative controls are implemented in accordance with the requirements of the Quality Assurance Topical Report and 10 CFR 50, Appendix B. The corrective actions and administrative controls for both safety related and non-safety related systems, structures and components are accomplished per the existing Corrective Action Program and PINGP administrative control program, and are applicable to all AMPs and activities that will be required during the period of extended operation. The confirmation process is part of the Corrective Action Program and includes reviews to assure that corrective actions are adequate, that they are adequately tracked and reported, and that corrective action effectiveness is reviewed. Follow-up actions required by the confirmation process are documented in accordance with the Corrective Action Program. The corrective actions, confirmation process, and administrative controls of the Quality Assurance Program are applicable to all AMPs and activities required during the period of extended operation.

These three elements will be applicable as follows:

Corrective Actions

PINGP has a single Corrective Action Program that is applied regardless of the safety classification of the structure or component. Corrective Action Program requirements are established in accordance with the requirements of the NMC Quality Assurance Topical Report and 10 CFR 50, Appendix B.

PINGP implements the NMC Corrective Action Program via NMC Fleet Procedures. These procedures require the initiation of an Action Request (AR) for actual or potential problems, including failures, malfunctions, discrepancies, deviations, defective material and equipment, nonconformances, and administrative control discrepancies, to ensure that conditions adverse to quality, and operability, functionality and reportability issues are promptly identified, evaluated if necessary, and corrected as appropriate.

Since the same 10 CFR 50, Appendix B Corrective Action Program is applied for nonconforming safety related and non-safety related structures and components subject to an aging management review for License Renewal, it is concluded that the PINGP Corrective Action Program is consistent with NUREG-1800 and NUREG-1801 Element 7, "Corrective Actions."

Confirmation Process

The confirmation process is part of the Corrective Action Program. The focus of the confirmation process is on the follow-up actions that must be taken to verify effective implementation of corrective actions. The measure of effectiveness is in terms of correcting the adverse condition and precluding repetition of significant conditions adverse to quality. NMC Fleet Procedures include provisions for timely evaluation of adverse conditions and implementation of any corrective actions required, including root cause determinations and prevention of recurrence where appropriate (e.g., significant conditions adverse to quality). These procedures provide for tracking, coordinating, monitoring, reviewing, verifying, validating, and approving corrective actions, to ensure effective corrective actions are taken. The Corrective Action Program is also monitored for potentially adverse trends. The existence of an adverse trend due to recurring or repetitive adverse conditions would result in the initiation of an AR. The AMPs or aging management activities required for License Renewal would also uncover any unsatisfactory condition due to ineffective corrective action.

Since the same 10 CFR 50, Appendix B corrective action and confirmation process is applied for nonconforming safety related and non-safety related structures and components subject to an aging management review for License Renewal, the PINGP Corrective Action Program is consistent with NUREG-1800 and NUREG-1801 Element 8, “Confirmation Process.”

Administrative Controls

The NMC Quality Assurance Program and associated procedures, review and approval processes, and administrative controls applicable to the AMPs and activities credited for License Renewal are implemented in accordance with the requirements of the NMC Quality Assurance Topical Report and 10 CFR 50, Appendix B. The administrative controls that govern aging management activities at PINGP are established in accordance with the PINGP Administrative Control Program and associated NMC fleet procedures. The PINGP Administrative Control Program implements the requirements of the NMC Quality Assurance Program, NMC Quality Assurance Topical Report, and 10 CFR 50, Appendix B.

Since the Quality Assurance Program and associated procedures provide the necessary administrative controls to the aging management programs, activities, and implementing documents in accordance with 10 CFR 50, Appendix B, it is concluded that the PINGP administrative controls are consistent with NUREG-1800 and NUREG-1801 Element 9, "Administrative Controls."

B1.4 Operating Experience

Operating Experience (OE) is an important resource used to identify Aging Effects Requiring Management (AERM) and to confirm the effectiveness of AMPs. Both PINGP-specific and industry OE records were reviewed to identify information that is related to aging effects and AMPs at PINGP. The relevant OE records were further evaluated as necessary to support the aging management review process and the AMP review process. See Section 3.0.1.3 for additional discussion.

The programs identified for aging management are discussed in this appendix. Operating experience related to the program/activity, including past corrective actions resulting in program enhancements, was considered. This information provides objective evidence that the effects of aging have been and will continue to be adequately managed.

B1.5 Aging Management Programs

The AMPs credited with managing the effects of aging at PINGP are described in the following sections. These programs are also discussed and evaluated in NUREG-1801. PINGP does not employ any plant-specific AMPs. The programs are either fully consistent with or are, with some exceptions and/or enhancements, consistent with the programs discussed in NUREG-1801.

1. 10 CFR Part 50, Appendix J Program [Section B2.1.1]
2. Aboveground Steel Tanks Program [Section B2.1.2]
3. ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program [Section B2.1.3]
4. ASME Section XI, Subsection IWE Program [Section B2.1.4]
5. ASME Section XI, Subsection IWF Program [Section B2.1.5]

6. Bolting Integrity Program [Section B2.1.6]
7. Boric Acid Corrosion Program [Section B2.1.7]
8. Buried Piping and Tanks Inspection Program [Section B2.1.8]
9. Closed-Cycle Cooling Water System Program [Section B2.1.9]
10. Compressed Air Monitoring Program [Section B2.1.10]
11. Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program [Section B2.1.11]
12. Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program [Section B2.1.12]
13. Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program [Section B2.1.13]
14. External Surfaces Monitoring Program [Section B2.1.14]
15. Fire Protection Program [Section B2.1.15]
16. Fire Water System Program [Section B2.1.16]
17. Flow-Accelerated Corrosion Program [Section B2.1.17]
18. Flux Thimble Tube Inspection Program [Section B2.1.18]
19. Fuel Oil Chemistry Program [Section B2.1.19]
20. Fuse Holders Program [Section B2.1.20]
21. Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program [Section B2.1.21]
22. Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program [Section B2.1.22]
23. Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program [Section B2.1.23]
24. Lubricating Oil Analysis Program [Section B2.1.24]
25. Masonry Wall Program [Section B2.1.25]

26. Metal-Enclosed Bus Program [Section B2.1.26]
27. Nickel-Alloy Nozzles and Penetrations Program [Section B2.1.27]
28. Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program [Section B2.1.28]
29. One-Time Inspection Program [Section B2.1.29]
30. One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program [Section B2.1.30]
31. Open-Cycle Cooling Water System Program [Section B2.1.31]
32. PWR Vessel Internals Program [Section B2.1.32]
33. Reactor Head Closure Studs Program [Section B2.1.33]
34. Reactor Vessel Surveillance Program [Section B2.1.34]
35. RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program [Section B2.1.35]
36. Selective Leaching of Materials Program [Section B2.1.36]
37. Steam Generator Tube Integrity Program [Section B2.1.37]
38. Structures Monitoring Program [Section B2.1.38]
39. Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program [Section B2.1.39]
40. Water Chemistry Program [Section B2.1.40]

B1.6 Time-Limited Aging Analyses Aging Management Programs

The AMPs credited with managing the effects of aging associated with Time-Limited Aging Analyses are described in the following sections. These programs are also discussed and evaluated in NUREG-1801. The programs are either fully consistent with or are, with enhancements, consistent with the programs discussed in NUREG-1801.

1. Environmental Qualification (EQ) of Electrical Components Program [Section B3.1]
2. Metal Fatigue of Reactor Coolant Pressure Boundary Program [Section B3.2]

B2.0 Aging Management Programs Correlation

The correlation between NUREG-1801 programs and PINGP programs is shown below. For the PINGP programs, links to appropriate sections of this appendix are provided.

NUREG-1801 ID	NUREG-1801 Program	PINGP Program	NUREG-1801 Comparison
NUREG-1801, Chapter XI			
XI.M1	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program [Section B2.1.3]	Existing Program, Consistent with NUREG-1801
XI.M2	Water Chemistry	Water Chemistry Program [Section B2.1.40]	Existing Program, Consistent with NUREG-1801 with Exception and Enhancement
XI.M3	Reactor Head Closure Studs	Reactor Head Closure Studs Program [Section B2.1.33]	Existing Program, Consistent with NUREG-1801 with Enhancement
XI.M4	BWR Vessel ID Attachment Welds	Not applicable to PWRs.	Not Applicable
XI.M5	BWR Feedwater Nozzle	Not applicable to PWRs.	Not Applicable
XI.M6	BWR Control Rod Drive Return Line Nozzle	Not applicable to PWRs.	Not Applicable
XI.M7	BWR Stress Corrosion Cracking	Not applicable to PWRs.	Not Applicable
XI.M8	BWR Penetrations	Not applicable to PWRs.	Not Applicable
XI.M9	BWR Vessel Internals	Not applicable to PWRs.	Not Applicable
XI.M10	Boric Acid Corrosion	Boric Acid Corrosion Program [Section B2.1.7]	Existing Program, Consistent with NUREG-1801
XI.M11	Nickel-Alloy Nozzles and Penetrations	Nickel-Alloy Nozzles and Penetrations Program [Section B2.1.27]	Consistent with NUREG-1801, See Note 1

NUREG-1801 ID	NUREG-1801 Program	PINGP Program	NUREG-1801 Comparison
XI.M11A	Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors	Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program [Section B2.1.28]	Existing Program, Consistent with NUREG-1801 with Enhancement
XI.M12	Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)	Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program [Section B2.1.39]	New Program, Consistent with NUREG-1801
XI.M13	Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS)	Not credited for aging management.	Not Applicable
XI.M14	Loose Part Monitoring	Not credited for aging management.	Not Applicable
XI.M15	Neutron Noise Monitoring	Not credited for aging management.	Not Applicable
XI.M16	PWR Vessel Internals	PWR Vessel Internals Program [Section B2.1.32]	Consistent with NUREG-1801, See Note 2
XI.M17	Flow-Accelerated Corrosion	Flow-Accelerated Corrosion Program [Section B2.1.17]	Existing Program, Consistent with NUREG-1801
XI.M18	Bolting Integrity	Bolting Integrity Program [Section B2.1.6]	Existing Program, Consistent with NUREG-1801 with Exception and Enhancement
XI.M19	Steam Generator Tube Integrity	Steam Generator Tube Integrity Program [Section B2.1.37]	Existing Program, Consistent with NUREG-1801 with Exception
XI.M20	Open-Cycle Cooling Water System	Open-Cycle Cooling Water System Program [Section B2.1.31]	Existing Program, Consistent with NUREG-1801

NUREG-1801 ID	NUREG-1801 Program	PINGP Program	NUREG-1801 Comparison
XI.M21	Closed-Cycle Cooling Water System	Closed-Cycle Cooling Water System Program [Section B2.1.9]	Existing Program, Consistent with NUREG-1801 with Exception and Enhancement
XI.M22	Boraflex Monitoring	Not credited for aging management.	Not Applicable
XI.M23	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program [Section B2.1.23]	Existing Program, Consistent with NUREG-1801 with Enhancement
XI.M24	Compressed Air Monitoring	Compressed Air Monitoring Program [Section B2.1.10]	Existing Program, Consistent with NUREG-1801 with Exception and Enhancement
XI.M25	BWR Reactor Water Cleanup System	Not applicable to PWRs.	Not Applicable
XI.M26	Fire Protection	Fire Protection Program [Section B2.1.15]	Existing Program, Consistent with NUREG-1801 with Exception and Enhancement
XI.M27	Fire Water System	Fire Water System Program [Section B2.1.16]	Existing Program, Consistent with NUREG-1801 with Enhancement
XI.M28	Buried Piping and Tanks Surveillance	Not credited for aging management.	Not Applicable
XI.M29	Aboveground Steel Tanks	Aboveground Steel Tanks Program [Section B2.1.2]	New Program, Consistent with NUREG-1801
XI.M30	Fuel Oil Chemistry	Fuel Oil Chemistry Program [Section B2.1.19]	Existing Program, Consistent with NUREG-1801 with Exception and Enhancement

NUREG-1801 ID	NUREG-1801 Program	PINGP Program	NUREG-1801 Comparison
XI.M31	Reactor Vessel Surveillance	Reactor Vessel Surveillance Program [Section B2.1.34]	Existing Program, Consistent with NUREG-1801 with Enhancement
XI.M32	One-Time Inspection	One-Time Inspection Program [Section B2.1.29]	New Program, Consistent with NUREG-1801
XI.M33	Selective Leaching of Materials	Selective Leaching of Materials Program [Section B2.1.36]	New Program, Consistent with NUREG-1801 with Exception
XI.M34	Buried Piping and Tanks Inspection	Buried Piping and Tanks Inspection Program [Section B2.1.8]	New Program, Consistent with NUREG-1801
XI.M35	One-Time Inspection of ASME Code Class 1 Small-Bore Piping	One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program [Section B2.1.30]	New Program, Consistent with NUREG-1801
XI.M36	External Surfaces Monitoring	External Surfaces Monitoring Program [Section B2.1.14]	Existing Program, Consistent with NUREG-1801 with Enhancement
XI.M37	Flux Thimble Tube Inspection	Flux Thimble Tube Inspection Program [Section B2.1.18]	Existing Program, Consistent with NUREG-1801 with Enhancement
XI.M38	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program [Section B2.1.22]	New Program, Consistent with NUREG-1801
XI.M39	Lubricating Oil Analysis	Lubricating Oil Analysis Program [Section B2.1.24]	Existing Program, Consistent with NUREG-1801
XI.S1	ASME Section XI, Subsection IWE	ASME Section XI, Subsection IWE Program [Section B2.1.4]	Existing Program, Consistent with NUREG-1801
XI.S2	ASME Section XI, Subsection IWL	Not credited for aging management.	Not Applicable

NUREG-1801 ID	NUREG-1801 Program	PINGP Program	NUREG-1801 Comparison
XI.S3	ASME Section XI, Subsection IWF	ASME Section XI, Subsection IWF Program [Section B2.1.5]	Existing Program, Consistent with NUREG-1801
XI.S4	10 CFR Part 50, Appendix J	10 CFR Part 50, Appendix J Program [Section B2.1.1]	Existing Program, Consistent with NUREG-1801
XI.S5	Masonry Wall Program	Masonry Wall Program [Section B2.1.25]	Existing Program, Consistent with NUREG-1801 with Enhancement
XI.S6	Structures Monitoring Program	Structures Monitoring Program [Section B2.1.38]	Existing Program, Consistent with NUREG-1801 with Enhancement
XI.S7	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program [Section B2.1.35]	Existing Program, Consistent with NUREG-1801 with Enhancement
XI.S8	Protective Coating Monitoring and Maintenance Program	Not credited for aging management.	Not Applicable
XI.E1	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program [Section B2.1.12]	New Program, Consistent with NUREG-1801
XI.E2	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program [Section B2.1.13]	New Program, Consistent with NUREG-1801
XI.E3	Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program [Section B2.1.21]	New Program, Consistent with NUREG-1801

NUREG-1801 ID	NUREG-1801 Program	PINGP Program	NUREG-1801 Comparison
XI.E4	Metal-Enclosed Bus	Metal-Enclosed Bus Program [Section B2.1.26]	New Program, Consistent with NUREG-1801
XI.E5	Fuse Holders	Fuse Holders Program [Section B2.1.20]	New Program, Consistent with NUREG-1801
XI.E6	Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program [Section B2.1.11]	New Program, Consistent with NUREG-1801 with Exception
NUREG-1801, Chapter X			
X.M1	Metal Fatigue of Reactor Coolant Pressure Boundary	Metal Fatigue of Reactor Coolant Pressure Boundary Program [Section B3.2]	Existing Program, Consistent with NUREG-1801 with Enhancement
X.S1	Concrete Containment Tendon Prestress	Not applicable to PINGP containment design.	Not Applicable
X.E1	Environmental Qualification (EQ) of Electrical Components	Environmental Qualification (EQ) of Electrical Components Program [Section B3.1]	Existing Program, Consistent with NUREG-1801

Notes:

1 A commitment is provided in Appendix A of this application [Section A2.27] to: (1) comply with applicable NRC Orders, and (2) implement applicable NRC Bulletins, Generic Letters, and staff-accepted industry guidelines.

2 A commitment is provided in Appendix A of this application [Section A2.32] 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.

B2.1 Aging Management Programs Details

B2.1.1 10 CFR Part 50, Appendix J Program

Program Description

The 10 CFR Part 50, Appendix J Program provides for containment system examinations and leakage testing. The program includes: scheduling of tests using risk and performance considerations, test methodology, overall containment leakage rate computations, leakage rate summations, acceptance criteria and corrective actions. Containment leak rate tests are performed to assure that leakage through the primary reactor containment, and systems and components penetrating primary containment, do not exceed allowable leakage rate values as specified in the Technical Specifications. Periodic surveillance of reactor containment penetrations and isolation valves is performed so that proper maintenance and repairs are made during the service life of the containment.

The program conforms to the requirements of 10 CFR 50, Appendix J, Option B. The program incorporates guidance provided in Regulatory Guide 1.163 as well as NEI 94-01. The containments and the individual isolation barriers are tested at intervals determined by risk and performance considerations as specified in Option B and the associated guidance documents, or as otherwise specifically approved by the NRC.

Test results are evaluated against the acceptance criteria given in Technical Specifications Section 5.5.14 and the component administrative leakage limits provided in the program documents. Corrective action is taken as necessary.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant 10 CFR Part 50, Appendix J Program is an existing program. It is consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.S4, 10 CFR Part 50, Appendix J.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The 10 CFR Part 50, Appendix J Program has been effective in managing leakage through the containment pressure boundary. The 10 CFR Part 50, Appendix J Program incorporates both industry and plant-specific operating experience to provide added assurance that aging effects related to leakage barriers of containment systems (containment shells and individual isolation barriers) are managed such that these systems will continue to perform their intended function(s) throughout the period of extended operation. As documented in the Option B performance based program, plant-specific operating experience serves as the basis for corrective action decisions as well as for the determination of leakage testing intervals.

PINGP has experienced significant leakage through air lock door operating shaft seals. The problem was resolved by replacing the seals with a type less susceptible to leakage, and performing more frequent testing. Other issues such as isolation valve seat degradation and air lock door seal damage have also been addressed through routine maintenance.

Conclusion

The 10 CFR Part 50, Appendix J Program is an existing program that has successfully managed the leak tight integrity of the containment systems, and has ensured the continuing effectiveness of the containment as a barrier against the release of radioactive material to the environment.

Implementation of the 10 CFR Part 50, Appendix J Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.2 Aboveground Steel Tanks Program

Program Description

The Aboveground Steel Tanks Program ensures the integrity of carbon steel tanks in scope of License Renewal that rest on soil or concrete such that the bottom exterior surface is potentially susceptible to corrosion due to the ingress of water, while being inaccessible for visual inspection. The program provides for visual inspections of tank external surfaces down to their contact with the foundation, including any sealants/caulking at the foundation interfaces. It also provides for ultrasonic bottom thickness measurements from inside the tank to determine if significant thinning is occurring on the inaccessible bottom surface of the tank. External tank surfaces are coated with protective paint or coatings to prevent corrosion. This program manages the effects of both coating degradation and corrosion on the intended function(s) of the tanks.

For insulated outdoor tanks, the inspections cover the exterior surface of the insulation, and specifically looks for damage to insulation or its outer covering that could permit water ingress, and for discoloration or other evidence that the insulation has been wetted. If insulation damage or wetting is identified, insulation will be removed at the affected location to permit direct inspection of the external tank surface. In addition, sample sections of insulation near the bottom of each insulated outdoor tank (i.e., locations with the highest potential for wetted insulation) will be removed periodically to permit direct inspection of the tank exterior.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Aboveground Steel Tanks Program is a new program. It will be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M29, Aboveground Steel Tanks.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Prairie Island Nuclear Generating Plant Aboveground Steel Tanks Program is a new program, and therefore, has no operating experience related to program implementation. At PINGP, past inspections have revealed instances of corrosion and coating degradation on the external surfaces of the outdoor condensate storage tanks. The corrosion was documented and determined to be within the design corrosion allowance of the tanks.

Conclusion

The Aboveground Steel Tanks Program is a new program that will visually inspect for corrosion of accessible external tank surfaces. Tank wall thinning due to corrosion of external surfaces that are inaccessible (e.g., bottoms of tanks that sit directly on the ground or other support structures), will be detected by ultrasonic thickness measurements from inside the tank.

Implementation of the Aboveground Steel Tanks Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

This program will be implemented prior to the period of extended operation.

B2.1.3 ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program

Program Description

The ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program (IWB, IWC, and IWD Program) provides for condition monitoring of ASME Class 1, 2 and 3 pressure-retaining components, their welded integral attachments, and bolting. The program is implemented in accordance with the requirements of 10 CFR 50.55a, with specified limitations, modifications and NRC-approved alternatives, and utilizes ASME Section XI, Subsections IWB, IWC, and IWD, 1998 Edition including the 1998, 1999 and 2000 Addenda, for the current inspection interval. The program includes periodic visual, surface, and/or volumetric examinations of Class 1, 2 and 3 pressure-retaining components, their welded integral attachments, and bolting. Leakage tests are periodically performed on Class 1, 2, and 3 pressure-retaining components. The program also provides component repair and replacement requirements in accordance with ASME Section XI.

Class 1 dissimilar metal welds in nozzles and Class 1 and 2 welds in piping are inspected in accordance with the NRC-approved Risk Informed Inservice Inspection Program.

The provisions of ASME Section XI are augmented by additional inspections to detect general and pitting corrosion on the shell to transition cone weld of the Westinghouse Model 51 steam generators in Unit 2. Westinghouse Model 51 steam generators have a high stress region at the shell to transition cone weld, and corrosion of the steam generator shell is known to exist. See Section 3.1.2.2.2 for additional discussion.

The IWB, IWC, and IWD Program is updated periodically as required by 10 CFR 50.55a.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program is an existing program. It is consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M1, ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

A review of operating experience for the IWB, IWC, and IWD Program identified no adverse trends or issues with program performance. Minor conditions such as gasket leakage have been identified and corrected prior to causing any significant impact to safe operation or loss of intended functions. Examples of operating experience that have resulted in program updates are as follows:

- In January 1988, PINGP Unit 2 detected a leak in the Safety Injection 22 Accumulator Tank. The leak was determined to be in a two-inch diameter nozzle for the water level sensing instrumentation line. It was determined that the failure mode was IGSCC resulting in a crack that started as a consequence of high stresses caused by the improper fit-up of the pipe to the nozzle in preparation for welding. The leak was repaired. The nozzles on both Units 1 and 2 continue to be examined on a 10-year frequency. In addition, these nozzles are inspected for leakage as a normal part of the ASME Section XI Pressure Testing Program.
- In May 2005, cracks were found in the 21 Accumulator Tank in PINGP Unit 2. The cracks were repaired. In addition, procedures were developed to perform a periodic external ultrasonic inspection (UT) and an internal visual examination (VT) and dye penetrant examination (PT) of the Safety Injection Accumulators.

The review of operating experience indicates the IWB, IWC, and IWD Program is effective in monitoring and detecting degradation and taking effective corrective actions as needed when acceptance criteria are not met.

Conclusion

The ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program is an existing program which provides for condition monitoring of Class 1, 2, and 3 pressure-retaining components, their welded attachments, and bolting. The program has been effective in monitoring Class 1, 2, and 3 components and no adverse trends or significant conditions related to these components have been identified.

Implementation of the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.4 ASME Section XI, Subsection IWE Program

Program Description

The ASME Section XI, Subsection IWE Program (IWE Program) provides for condition monitoring of Class MC pressure-retaining components and their related items, including integral attachments, seals, gaskets, moisture barriers, and pressure-retaining bolting. The program is implemented in accordance with the requirements of 10 CFR 50.55a, with specified limitations, modifications and NRC-approved alternatives, and utilizes ASME Section XI, Subsection IWE, 1992 Edition including the 1992 Addenda, for the current inspection interval.

Class MC components at PINGP include the containment vessels, personnel airlocks, equipment hatches, mechanical penetrations, and electrical penetrations.

The IWE Program monitors for aging effects by performing visual examinations (general, VT-3, VT-1) of the Class MC components and their related items. Visual (VT-1) or volumetric examinations, as applicable, are performed on components that require augmented examination. Leak testing is also periodically performed in accordance with the 10 CFR 50, Appendix J Program [Section B2.1.1], to detect leakage from the pressure-retaining Class MC components.

The IWE Program is updated periodically as required by 10 CFR 50.55a.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant ASME Section XI, Subsection IWE Program is an existing program. It is consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.S1, ASME Section XI, Subsection IWE.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

A review of operating experience for the IWE Program identified no adverse trends or issues with program performance. Issues with minor coating degradation have been identified and corrected prior to causing any significant impact to safe operation or loss of intended functions. Inservice inspections have not revealed adverse trends or significant conditions relevant to the IWE Program.

The review of operating experience indicates the IWE Program is effective in monitoring and detecting degradation, and taking effective corrective actions as needed when acceptance criteria are not met.

Conclusion

The ASME Section XI, Subsection IWE Program is an existing program which provides for the condition monitoring of Class MC pressure-retaining components and their related items, including integral attachments, seals, gaskets, moisture barriers, and pressure retaining bolting. The program has been effective in monitoring Class MC components and their related items, and no adverse trends or significant conditions related to these components and items have been identified.

Implementation of the ASME Section XI, Subsection IWE Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.5 ASME Section XI, Subsection IWF Program

Program Description

The ASME Section XI, Subsection IWF Program (IWF Program) provides for condition monitoring of Class 1, 2 and 3 component supports. The program is implemented in accordance with the requirements of 10 CFR 50.55a, with specified limitations, modifications and NRC-approved alternatives, and utilizes ASME Section XI, Subsection IWF, 1998 Edition, including the 1998, 1999 and 2000 Addenda, for the current inspection interval.

The component supports within the program include piping supports and supports other than piping supports as required by ASME Section XI. There are no Class MC component supports installed at PINGP. The IWF Program manages aging effects by performing periodic visual (VT-3) examinations. The scope of the component support examinations for each 10-year inspection interval is based on the total support population, with the largest sample size specified for the most critical component supports (Class 1) and smaller sample sizes for the less critical component supports (Class 2 and 3).

Component support examinations that reveal flaws or relevant conditions exceeding the acceptance standards of ASME Section XI result in an expansion of the inspection sample size in accordance with IWF-2430 to ensure that the full extent of the deficiencies are identified. Degradation that potentially compromises the support function or load capacity is evaluated. Acceptance criteria and corrective actions are in accordance with Subsection IWF. Component supports requiring corrective action are re-examined during the next inspection period in accordance with IWF-2420(b).

The IWF Program is updated periodically as required by 10 CFR 50.55a.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant ASME Section XI, Subsection IWF Program is an existing program. It is consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.S3, ASME Section XI, Subsection IWF.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

A review of operating experience for the IWF Program identified no adverse trends or issues with program performance. Minor conditions, such as improper spring can settings and unacceptable arc strikes, have been identified and corrected prior to causing any significant impact to safe operation or loss of intended functions. Adequate corrective actions were taken to prevent recurrence.

The review of operating experience indicates the IWF Program is effective in monitoring and detecting degradation and taking effective corrective actions as needed when acceptance criteria are not met.

Conclusion

The ASME Section XI, Subsection IWF Program is an existing program for condition monitoring of Class 1, 2, and 3 component supports. The program has been effective in monitoring Class 1, 2 and 3 component supports and no adverse trends or significant conditions related to these items have been identified.

Implementation of the ASME Section XI, Subsection IWF Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.6 Bolting Integrity Program

Program Description

The Bolting Integrity Program manages the aging affects associated with closure bolting in mechanical components and with structural bolting in the scope of License Renewal through periodic inspection, material selection, thread lubricant control, assembly and torque requirements, and repair and replacement requirements. For ASME Class 1, 2, 3 and MC components and their associated supports, these activities are based on the applicable requirements of the ASME Section XI edition and addenda specified by 10 CFR 50.55a with prescribed limitations, modifications and NRC-approved alternatives. Aging management activities for bolting consider the guidance contained in various NRC and industry reports and standards, including NUREG-1339, "Resolution of Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants," EPRI TR-111472, "Assembling Bolted Connections Using Spiral-Wound Gaskets," and EPRI NP-5769, "Degradation and Failure of Bolting in Nuclear Power Plants." Additional industry standards are also applied where appropriate, including EPRI TR-104213, "Bolted Joint Maintenance & Application Guide," and EPRI NP-5067 Volumes 1 and 2, "Good Bolting Practices."

The program includes preventive measures to preclude or minimize loss of preload, cracking and corrosion through material selection, lubricant control, and assembly and torque requirements. The program also includes periodic inspection of closure and structural bolting for indications of loss of preload (leaking or loose bolts/nuts), cracking, and loss of material due to corrosion.

Inspections of bolting within the scope of the Bolting Integrity Program are conducted under the following programs:

- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program,
- ASME Section XI, Subsection IWE Program,
- ASME Section XI, Subsection IWF Program,
- Buried Piping and Tanks Inspection Program,
- External Surfaces Monitoring Program,
- RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program, and
- Structures Monitoring Program.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Bolting Integrity Program is an existing program. It will be enhanced to be consistent, with exceptions, to the recommendations of NUREG-1801, Chapter XI, Program XI.M18, Bolting Integrity.

Exceptions to NUREG-1801

Program Elements Affected

- Parameters Monitored/Inspected, Detection of Aging Effects

  High strength bolting used in steam generator hold-down supports, reactor coolant pump supports, and other structural applications is periodically examined with visual techniques. Performing visual inspections of high strength bolts in lieu of a volumetric examination is an exception to the discussion provided in NUREG-1801, XI.M18. For stress corrosion cracking to occur in a susceptible high strength bolting material, a sustained high tensile stress and a corrosive environment must be present. Visual examinations of structural assemblies will detect corrosion or conditions indicative of a corrosive environment that could lead to stress corrosion cracking in potentially susceptible high strength bolting, and will cause appropriate corrective action to be taken under the Corrective Action Program when necessary. Corrective action may include volumetric examination of affected bolts, hammer testing, or other actions appropriate for the condition. Therefore, visual examination, as described, will effectively manage the aging of installed high strength bolting.

Enhancements

The following enhancements are required to satisfy NUREG-1801 aging management program recommendations. Enhancements will be implemented prior to the period of extended operation.

- Parameters Monitored/Inspected, Detection of Aging Effects

  Procedures for the conduct of inspections in the External Surfaces Monitoring Program, Structures Monitoring Program, Buried Piping and Tanks Inspection Program, and the RG 1.127 Inspection of Water-Control Structures Associated with Nuclear Power Plants Program will be enhanced to include guidance for visual inspections of installed bolting.

Operating Experience

Both the industry and NRC have identified a number of bolting concerns ranging from material control and certification to bolting practices, use of lubrication, and the impact of aging mechanisms. The Bolting Integrity Program incorporates both plant and industry experience on bolting issues. For example, NRC Information Notices, Bulletins, Circulars, and Generic Letters listed in Section 3 of NUREG-1339 were previously evaluated and addressed at PINGP. Some of these resulted in confirmatory analysis or inspections, and others in modifications or the addition of controls to the procurement or design process. A review of plant operating experience from the site Corrective Action Program identified issues with missing or loose bolts or nuts, inadequate thread engagement, and some leaking flanges. The identified concerns were corrected or evaluated and determined to be acceptable as-is. Additional actions, such as procedural enhancements or bolt re-designs, were implemented as needed to minimize the potential for recurrence.

Early in plant life stress corrosion cracking of some steam generator support bolts was experienced at PINGP and reported to the NRC in Licensee Event Report 80-25. A number of steam generator pad hold down bolts were found to have cracks. A number of contributors caused this condition including excessive torque application, presence of some chlorine and zinc, installation alignment concerns, and sharp thread relief. New bolts which used a rolled thread were installed in many locations, alignment was corrected, bolts were cleaned with low halogen and low sulfur material, certified lubricants were used, exposed heads were seal coated with a high temperature silicone paint (to prevent moisture exposure), and lower torque values were applied. High strength bolts in NSSS supports continue to be inspected visually under the ASME Section XI, Subsection IWF Program.

Conclusion

The Bolting Integrity Program is an existing program that includes requirements for bolt material selection, control, assembly, bolt-up patterns, torquing, and use of thread lubricants consistent with industry guidance and industry and plant-specific operating experience. Several AMPs are credited by the Bolting Integrity Program to inspect mechanical closure and structural bolting within the scope of the Bolting Integrity Program. Collectively, the credited programs, as enhanced, effectively manage aging effects in mechanical closure and structural bolting in the scope of the Bolting Integrity Program.

Implementation of the enhanced Bolting Integrity Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.7 Boric Acid Corrosion Program

Program Description

The Boric Acid Corrosion Program is a condition monitoring program developed in accordance with NRC Generic Letter 88-05, “Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants.” The program performs periodic visual examinations of the reactor coolant pressure boundary and other systems containing borated water for evidence of leakage and corrosion. Adjacent structures, components (including electrical), and supports are also examined for boric acid accumulation and corrosion. The program includes evaluations, assessments, and corrective actions for observed leakage sources and any affected structures and components.

The program also monitors and inspects piping and components containing borated water that are outside the program scope established in response to Generic Letter 88-05. The program addresses operating experience contained in recent NRC generic communications, including program experience summarized in Regulatory Issue Summary 2003-013, “NRC Review of Responses to Bulletin 2002-01, 'Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity’.”

Borated water leakage or boric acid crystals may also be discovered while performing other PINGP activities such as normal plant walkdowns, operational rounds, and maintenance. The Boric Acid Corrosion Program includes provisions for triggering evaluations and assessments when leakage is discovered while performing these activities.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Boric Acid Corrosion Program is an existing program. It is consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M10, Boric Acid Corrosion.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

A review of operating experience for the Boric Acid Corrosion Program identified no adverse trends or issues with program performance. Borated water leakage and boric acid crystal accumulations have been identified and corrected prior to causing any significant impact to safe operation or loss of intended functions. Adequate corrective actions were taken to prevent recurrence.

NRC Information Notices 86-108 [and supplements 1 through 3], 2003-02, and NRC Bulletin 2002-01 were reviewed and taken into consideration in the development of the Boric Acid Corrosion Program to ensure that even small boric acid leaks do not lead to degradation of the plant.

Conclusion

The Boric Acid Corrosion Program is an existing program which performs periodic condition monitoring of systems and components containing borated water, including adjacent structures, components and supports, and ensures that boric acid corrosion is being acceptably managed. The program has been effective in monitoring and detecting leakage and taking effective corrective actions as needed when borated water or boric acid crystals are identified.

Implementation of the Boric Acid Corrosion Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.8 Buried Piping and Tanks Inspection Program

Program Description

The Buried Piping and Tanks Inspection Program manages loss of material on the external surfaces of carbon steel and cast iron components that are buried in soil or sand. As a preventive measure, buried pipe is coated and wrapped prior to initial installation in accordance with standard industry practices to prevent/mitigate corrosion. The program performs visual inspections following excavation of external surfaces of buried components (e.g., piping, tanks, bolting) for evidence of coating damage and degradation of the underlying carbon steel and cast iron. If no evidence of damage to the coating or wrapping is detected, then the coating or wrapping will not be removed for further inspection. The periodicity of these inspections will be based on opportunities for inspection such as scheduled maintenance work, with at least one inspection occurring within ten years prior to the period of extended operation, and one in each ten-year period thereafter. If an opportunity for inspection does not occur within a ten-year period, then a focused inspection of a sample component will be performed prior to the end of that period.

The Buried Piping and Tanks Inspection Program assures that the effects of aging on buried piping, tanks and miscellaneous components are being effectively managed for the period of extended operation. Evidence of damage to the coating or wrapping, such as coating perforation, holidays, or other damage, will cause the protected component to be inspected for evidence of loss of material. Following the inspection of the external surface of the exposed component, the coating or wrap will be repaired to restore the preventive attributes.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Buried Piping and Tanks Inspection Program is a new program. It will be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M34, Buried Piping and Tanks Inspection.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Buried Piping and Tanks Inspection Program is a new program, and therefore, has no operating experience related to program implementation. A review of operating experience did reveal that portions of the Cooling Water and Fire Protection Systems' buried piping were replaced in 1992 as a result of MIC indications on the internal surfaces of dead-leg portions of these systems. Although no documented observations of the condition of the external piping coatings/surfaces were found other than limited photographs, interviews have indicated that no external surface degradation or anomalies were identified.

Conclusion

The Buried Piping and Tanks Inspection Program is a new program that will perform inspections of opportunity on external surfaces of carbon steel and cast iron components that are buried in soil or sand.

Implementation of the Buried Piping and Tanks Inspection Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

This program will be implemented prior to the period of extended operation.

B2.1.9 Closed-Cycle Cooling Water System Program

Program Description

The Closed-Cycle Cooling Water System Program is both a preventive and condition monitoring program that is based on Electric Power Research Institute (EPRI) Closed Cooling Water Chemistry Guideline", TR-107396, Revision 1. The program includes preventive measures to minimize corrosion, heat transfer degradation, and stress corrosion cracking (SCC); and testing and inspection to monitor the effects of corrosion, heat transfer degradation, and SCC on the intended functions of the components. The preventive measures consist of maintaining the system corrosion inhibitor concentrations within the specified limits by periodic testing. Testing is performed to verify key chemistry parameters and to measure impurities, conductivity and microbiological growth. Inspections are performed to identify corrosion, fouling and SCC that may be present. Cleaning and inspection of heat exchangers are performed periodically along with pump and heat exchanger performance/functional testing. The combination of chemistry control, testing and inspection provide reasonable assurance that the components within the scope of this program will continue to perform their intended functions.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Closed-Cycle Cooling Water System Program is an existing program. It will be enhanced to be consistent, with exceptions, to the recommendations of NUREG-1801, Chapter XI, Program XI.M21, Closed-Cycle Cooling Water System.

Exceptions to NUREG-1801

Program Elements Affected

- Preventive Actions

  PINGP implements the guidance provided in EPRI TR-107396, Revision 1 (1007820), "Closed Cooling Water Chemistry Guideline," April 2004, in lieu of the NUREG-1801 recommendation of EPRI TR-107396, Revision 0, "Closed Cooling Water Chemistry Guideline," October 1997. Revision 1 is the most recent revision of this document and it provides more prescriptive guidance based on the latest industry operating experience. Use of the current guideline is an acceptable method to maintain the closed-cycle cooling water systems at PINGP.

- Parameters Monitored/Inspected

  Some of the pump and heat exchanger performance parameters recommended by NUREG-1801 are not used by PINGP for monitoring specific pumps or smaller converters serviced by the closed-cycle cooling water systems. Chemical controls and established performance monitoring techniques, based on plant experience, are adequate to detect changes in system performance due to corrosion or cracking.

Enhancements

The following enhancement is required to satisfy NUREG-1801 aging management program recommendations. The enhancement will be implemented prior to the period of extended operation.

- Monitoring and Trending

  The program will be enhanced to include an internal visual examination of accessible surfaces of components serviced by closed-cycle cooling water when the systems or components are opened during scheduled maintenance or surveillance activities.

Operating Experience

A review of operating experience for the Closed-Cycle Cooling Water System Program identified no adverse trends or issues with program performance. Conditions such as corrosion, fouling, and out of range chemistry parameters have been identified and corrected prior to causing any significant impact to safe operation or loss of intended functions. Adequate corrective actions were taken to prevent recurrence.

The review of operating experience indicates the Closed-Cycle Cooling Water System Program is effective in monitoring and detecting degradation and taking effective corrective actions as needed when acceptance criteria are not met.

Conclusion

The Closed-Cycle Cooling Water System Program is an existing program that is based on water chemistry control, inspections and performance/functional testing. The program has been effective in monitoring the closed-cycle cooling water systems and their components and no adverse trends or significant conditions related to these systems and components have been identified.

Implementation of the enhanced Closed-Cycle Cooling Water System Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.10 Compressed Air Monitoring Program

Program Description

The Compressed Air Monitoring Program is a condition monitoring program that manages the effects of corrosion and the presence of unacceptable levels of contaminants for the Station and Instrument Air System. The program conducts periodic air quality sampling, inspections, component functional testing, and leakage testing. Additionally, preventive maintenance is performed at regular intervals to assure system components continue to operate reliably, thereby assuring that quality air is supplied to plant equipment.

The program implements the commitments made in response to NRC Generic Letter 88-14, “Instrument Air Supply System Problems Affecting Safety-Related Equipment,” as well as the recommendations associated with the Institute of Nuclear Power Operations Significant Operating Experience Report (INPO SOER) 88-01, “Instrument Air System Failures.” The preventive maintenance program associated with the Station and Instrument Air System is based upon manufacturer's recommendations and industry guidance. Implementation of program activities and associated corrective actions ensure that the Station and Instrument Air System is operated within specified limits.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Compressed Air Monitoring Program is an existing program. It will be enhanced to be consistent, with exceptions, to the recommendations of NUREG-1801, Chapter XI, Program XI.M24, Compressed Air Monitoring.

Exceptions to NUREG-1801

Program Elements Affected

- Preventive Actions, Detection of Aging Effects:

  The PINGP Compressed Air Monitoring Program does not explicitly incorporate the performance testing guidelines provided in EPRI NP-7079, EPRI TR-108147, and ASME OM-S/G-1998, Part 17, that are listed in NUREG-1801. The PINGP Station and Instrument Air System is an older installation which was not designed and installed with the instrumentation and features (i.e., in-line dew point indication with alarm) necessary to conduct the specified performance testing. Instead, preventive maintenance activities are conducted on Station and Instrument Air System components, based upon manufacturer's recommendations and other EPRI guidance. These routine maintenance activities in conjunction with system inspections and system alarms provide for sufficient inspection and monitoring to ensure the timely detection of aging effects such that the Station and Instrument Air System is capable of performing its intended function.

Enhancements

The following enhancement is required to satisfy NUREG-1801 aging management program recommendations. The enhancement will be implemented prior to the period of extended operation.

- Preventive Actions, Acceptance Criteria:

  Station and Instrument Air System air quality will be monitored and maintained in accordance with the instrument air quality guidance provided in ISA S7.0.01-1996. Particulate testing will be revised to use a particle size methodology as specified in ISA S7.0.01.

Operating Experience

A review of operating experience for the Compressed Air Monitoring Program indicates that degraded conditions have been identified and corrected prior to causing any significant impact to Station and Instrument Air System operation or loss of intended functions. Concerns with compressor and dryer reliability have resulted in increased monitoring and plans for equipment replacement. While additional activities are in progress to improve system performance, the quality of the air supply to the plant continues to be maintained at satisfactory levels.

Conclusion

The Compressed Air Monitoring Program is an existing program that manages the effects of corrosion and the presence of unacceptable levels of contaminants for the Station and Instrument Air System. The program has effectively monitored the Station and Instrument Air System to ensure the effects of corrosion are managed.

Implementation of the Compressed Air Monitoring Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.11 Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program

Program Description

The Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program conducts a one-time test of a representative sample of electrical cable connections (metallic portions) to confirm the absence of aging effects (loose connections). Cable connections terminating within an active or passive device/enclosure from external sources are within the scope of this program. Cable/wiring connections terminating within an active or passive device/enclosure from internal sources are not within the scope of this program.

The program manages the aging effects of loose connections and electrical failure from the following aging stressors: thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion and oxidation. The representative sample includes connections of various voltage applications (medium and low voltage), circuit loadings, and locations (high temperature, high humidity, vibration, etc.). The technical basis for the sample selections will be documented.

The specific type of test performed is determined prior to the initial test, and is to be a proven test for detecting loose connections, such as thermography, contact resistance testing, or other proven test. If an unacceptable condition is identified, the Corrective Action Program is used to evaluate additional requirements. This one-time program will be conducted prior to the period of extended operation.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new program. It will be consistent, with exceptions, to the recommendations of NUREG-1801, Chapter XI, Program XI.E6, Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements. The exceptions, however, are consistent with the proposed Interim Staff Guidance LR-ISG-2007-02, noticed for public comment in the Federal Register on September 6, 2007 (FRN 72FR51256).

Exceptions to NUREG-1801

Program Elements Affected

- Scope of Program, Parameters Monitored/Inspected, Detection of Aging Effects, Monitoring and Trending

  The Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is consistent with NUREG-1801 as it is modified by the proposed LR-ISG-2007-02 published on September 6, 2007.

  NUREG-1801 describes an AMP for electrical cable connections in Chapter XI, Program XI.E6, “Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements.” A revision to this program is being developed via the Interim Staff Guidance (ISG) process. The revised program was published for public comment on September 6, 2007, in Federal Register Notice 72FR51256 “Proposed License Renewal Interim Staff Guidance LR-ISG-2007-02: Changes to Generic Aging Lesson Learned (GALL) Report Aging Management Program (AMP) XI.E6, 'Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements’ Solicitation of Public Comment.”

Enhancements

None

Operating Experience

The Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new program, and therefore, has no operating experience related to program implementation.

A review of PINGP operating experience identified one significant connection failure that resulted in a fire. The cause of this failure was determined to be from either improper re-silvering of the bus contacts, improper connection during maintenance activities, and/or manufacturers' design flaw (tulip connection) where connection pieces may break (unnoticed) during reconnection activities. None of the failure causes were age-related, but the detrimental effects of the improper connection heightened the awareness and importance of having sound electrical connections (regardless of cause of loose connections), and resulted in an expansion of the number of electrical connections periodically inspected under the PINGP Thermography Program. The Corrective Action Program evaluation also investigated similar connections in detail, and found no similar loose connections that would lead to circuit failure or fire. A procedure change was made to include an acceptable and consistent contact re-silvering process.

Conclusion

The Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new, one-time, sampling inspection program that will use thermography, resistance testing, or other proven test to detect loose electrical connections.

Implementation of the Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program will provide reasonable assurance that aging effects will be managed such that electrical cable connections within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

This program will be completed prior to the period of extended operation.

B2.1.12 Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program

Program Description

The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program manages the aging effect reduced insulation resistance on insulated electrical cables and connections (includes splices, terminations, fuse blocks, connectors, and insulation portions of electrical penetrations) installed in adverse localized environments (e.g., high temperature, radiation and/or moisture levels significantly more severe than design service conditions) to ensure cable and connection insulation integrity is maintained throughout the period of extended operation. The program includes all accessible non-EQ insulated cables and connections within the scope of License Renewal. The program conducts periodic visual inspections on a representative sample of accessible cables and connections in identified adverse localized environments, to confirm insulation integrity. Inspections are performed at least once every ten years, with the first inspection completed before the period of extended operation. If an unacceptable condition is identified on a cable or connection in the inspection sample, a determination is made as to whether the same condition is applicable to other accessible or inaccessible cables or connections. This program considers the technical information and guidance provided in NUREG/CR-5643, IEEE Std. P1205, SAND96-0344, and EPRI TR-109619.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new program. It will be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.E1, Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new program, and therefore, has no operating experience related to program implementation. However, both plant and industry operating experience will be used to provide examples of adverse localized environments to establish sample size and develop inspection locations.

At PINGP there have been instances where adverse localized environments for electrical cables and connections were suspected to have caused localized cable and connection insulation degradation. Most of the cases did not clearly define whether the degradation was conductor insulation degradation or cable jacket degradation. The noted cases of degradation resulted in the replacement or rework of the affected cable or connection jacket/insulation.

Conclusion

The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new program that conducts periodic visual inspections on a representative sample of accessible cables and connections in identified adverse localized environments, to ensure/maintain cable and connection insulation integrity.

Implementation of the Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program provides reasonable assurance that aging effects will be managed such that the electrical cables and connections within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

This program will be implemented prior to the period of extended operation.

B2.1.13 Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program

Program Description

The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program is a condition monitoring program that manages the aging effect of reduced insulation resistance on non-EQ sensitive (high voltage, low signal) instrumentation circuit cables and connections exposed to adverse ambient or adverse localized environments to maintain electrical circuit integrity throughout the period of extended operation. An adverse localized environment is a condition of high temperature, radiation and/or moisture that is significantly more severe than the specified service environment for the cable. This program includes either periodic review of surveillance data, or testing of cables and connections, for non-EQ sensitive instrumentation circuits in scope of License Renewal, and considers the technical information and guidance provided in NUREG/CR-5643, IEEE Std. P1205, SAND96-0344, and EPRI TR-109619. The cables and connections in scope of this program are those associated with high-range-radiation and neutron flux monitoring instrumentation circuits that are sensitive to a reduction in insulation resistance.

The cables and connections (circuits) in scope of this program that have calibration or surveillance tests are subject to periodic review and evaluation to determine the existence of aging. If adverse aging effects are detected from these reviews, an aging evaluation is conducted for other cables and connections subjected to the same aging environment. Cables and connections (circuits) in scope of this program that are not covered by calibration or surveillance testing, will be subject to cable testing. The first reviews/tests will be completed before the period of extended operation, and subsequent reviews/tests will be conducted at least once every ten years thereafter.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program is a new program. It will be consistent with the recommendations of NUREG-1801, Program XI.E2, Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program is a new program, and therefore, has no operating experience related to program implementation. NRC, industry, and plant operating experience will be used in the development of the program.

Plant-specific operating experience has revealed cases where adverse localized environments for sensitive instrumentation cables and connections were suspected to have caused adverse/erratic signals. The identified cases of degradation resulted in the replacement or rework of the affected cable/connection.

Conclusion

The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program is a new program that implements periodic reviews of surveillance data or cable tests on non-EQ sensitive instrumentation circuits (electrical cables and connections) exposed to adverse ambient or adverse localized environments.

Implementation of the Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program provides reasonable assurance that aging effects will be managed such that the electrical cables and connections within the scope of this program will continue to perform their intended functions during the period of extended operation.

This program will be implemented prior to the period of extended operation.

B2.1.14 External Surfaces Monitoring Program

Program Description

The External Surfaces Monitoring Program is a condition monitoring program that implements inspections and walkdowns of systems and components within the scope of the program. Periodic system inspections and walkdowns are conducted to visually inspect accessible external surfaces of piping, piping components, ducting, and other metallic and non-metallic components for aging degradation (e.g., evidence of loss of material, cracking and leakage).

The program manages aging effects by performing visual inspections of external surfaces for evidence of loss of material due to corrosion or wear; cracking or change in material properties due to ozone, ultraviolet or thermal exposure; and heat transfer degradation due to fouling. Leakage, if present, is also identified during the inspections. Additionally, the program is credited with managing aging effects of internal surfaces for situations in which the external surface is subject to the same environment or stressor as the internal surface, such that external surface condition is representative of internal surface condition.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant External Surfaces Monitoring Program is an existing program. It will be enhanced to be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M36, External Surfaces Monitoring.

Exceptions to NUREG-1801

None

Enhancements

The following enhancements are required to satisfy NUREG-1801 aging management program recommendations. Enhancements will be implemented prior to the period of extended operation.

- Scope of Program

  The scope of the program will be expanded as necessary to include all metallic and non-metallic components within the scope of License Renewal that require aging management in accordance with this program.

  The program will be enhanced to ensure that surfaces that are inaccessible or not readily visible during plant operations will be inspected during refueling outages.

  The program will be enhanced to ensure that surfaces that are inaccessible or not readily visible during both plant operations and refueling outages will be inspected at intervals that provide reasonable assurance that aging effects are managed such that the applicable components will perform their intended function during the period of extended operation.

Operating Experience

A review of operating experience for the External Surfaces Monitoring Program identified no adverse trends or issues with program performance. Plant equipment issues, such as corrosion and leakage, have been identified and corrected prior to causing any significant impact to safe operation or loss of intended functions. Adequate corrective actions were taken to prevent recurrence.

The review of operating experience indicates the External Surfaces Monitoring Program is effective in monitoring and detecting degradation and taking effective corrective actions as needed when acceptance criteria are not met.

Conclusion

The External Surfaces Monitoring Program is an existing program that is based on periodic system inspections and walkdowns. The program has been effective in monitoring external surfaces of components, and no adverse trends or significant conditions related to these components have been identified.

Implementation of the enhanced External Surfaces Monitoring Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.15 Fire Protection Program

Program Description

The Fire Protection Program is a condition monitoring program which consists of fire barrier inspection activities, diesel-driven fire pump inspection activities and halon/carbon dioxide (CO_2) fire suppression system inspection activities. The fire barrier inspection activities include periodic visual inspection of fire barrier penetration seals, fire barrier walls, ceilings, and floors, and periodic inspection and functional testing of all fire-rated doors that perform a fire barrier function to ensure that their operability and intended functions are maintained. The diesel-driven fire pump inspection activities include periodic pump performance testing to ensure that the fuel supply line can perform its intended function. The halon/CO_2 fire suppression system inspection activities include both periodic inspection and functional testing of the halon/CO_2 fire suppression system to manage the aging effects and degradation that may affect the intended function and performance of the system.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Fire Protection Program is an existing program. It will be enhanced to be consistent, with exceptions, to the recommendations of NUREG-1801, Chapter XI, Program XI.M26, Fire Protection.

Exceptions to NUREG-1801

Program Elements Affected

- Parameters Monitored/Inspected

  The Relay/Cable Spreading Room and Computer Room CO_2 System is functionally tested and visually inspected every 18 months instead of every six months as recommended in NUREG-1801, XI.M26. The surveillance interval is specified in the NRC-approved fire protection program, which is an element of the plant's licensing basis, and is historically traceable to the plant Technical Specifications. Functional testing and visual inspections performed every 18 months are sufficient to identify material conditions that may affect the performance of the system.

  The halon system smoke detectors in the computer room and the Old Administration Building vault are functionally tested every 3 and 5 years respectively, instead of every six months as recommended in NUREG-1801, XI.M26. Functional testing the smoke detectors in the computer room and vault every 3 and 5 years respectively, will be sufficient to identify degradation that may affect the performance of the systems.

Enhancements

The following enhancements are required to satisfy NUREG-1801 aging management program recommendations. Enhancements will be implemented prior to the period of extended operation.

- Parameters Monitored/Inspected

  The Fire Protection Program will be enhanced to require functional testing of the halon system smoke detectors in the guardhouse every 5 years.

- Detection of Aging Effects

  The Fire Protection Program will be enhanced to require periodic visual inspection of the fire barrier walls, ceilings, and floors to be performed during walkdowns at least once every refueling cycle.

Operating Experience

A review of operating experience for the Fire Protection Program identified no adverse trends or issues with program performance. Minor concerns, such as fire doors not closing properly, have been identified and corrected prior to causing any significant impact to safe operation or loss of intended functions. A recent example of corrective actions to prevent recurrence were modifications made to fire doors to prevent the recurrence of the doors not closing properly due to inadequate clearances or improper adjustments.

The review of operating experience indicates the Fire Protection Program is effective in monitoring and detecting degradation and taking effective corrective actions as needed when acceptance criteria are not met.

Conclusion

The Fire Protection Program is an existing program that implements periodic inspections and functional testing (as applicable) for fire barriers, diesel-driven fire pumps, and the halon/carbon dioxide (CO_2) fire suppression system.

Implementation of the enhanced Fire Protection Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.16 Fire Water System Program

Program Description

The Fire Water System Program is a condition monitoring program that conducts inspections and performance tests of water-based fire protection system components such as sprinklers, nozzles, fittings, valves, hydrants (including hose and gaskets), hose stations, standpipes, and aboveground and underground piping and components. Inspection and testing are performed in accordance with applicable National Fire Protection Association (NFPA) codes and standards, and NRC commitments. Fire protection system piping is subject to periodic flushing, flow testing and wall thickness evaluations to ensure that corrosion, MIC, and fouling are managed such that the system function is maintained. Additionally, internal portions of the fire water system are visually inspected when disassembled for maintenance. The system is normally maintained at the required operating pressure. A loss of system pressure requiring the fire pump to automatically start would be immediately detected in the control room and corrective actions would be initiated. Prior to exceeding the 50-year service life, sprinkler heads will be replaced or be subject to representative sample testing.

Inspections will be performed before the end of the current operating term and at plant-specific intervals during the period of extended operation as determined by an engineering evaluation to ensure that degradation will be detected before the loss of intended function.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Fire Water System Program is an existing program. It will be enhanced to be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M27, Fire Water System.

Exceptions to NUREG-1801

None

Enhancements

The following enhancements are required to satisfy NUREG-1801 aging management program recommendations. Enhancements will be implemented prior to the period of extended operation.

- Detection of Aging effects

  The program will be enhanced to include eight additional yard fire hydrants in the scope of the annual visual inspection and flushing activities.

  Sprinkler heads that have been in place for 50 years will be replaced or a representative sample of sprinkler heads will be tested using the guidance of NFPA 25, "Inspection, Testing and Maintenance of Water-Based Fire Protection Systems" (2002 Edition, Section 5.3.1.1.1). Sample testing, if performed, will continue at a 10-year interval following the initial testing.

Operating Experience

A review of operating experience for the Fire Water System Program identified no adverse trends or issues with program performance. Issues have been identified and corrected prior to causing any significant impact to safe operation or loss of intended functions. Adequate corrective actions were taken. Examples of issues which have been identified and corrected include fire hydrant corrosion and leakage, piping below minimum required wall thickness, and low fire detector sensitivities.

The review of operating experience indicates the Fire Water System Program is effective in monitoring and detecting degradation and taking effective corrective actions as needed when acceptance criteria are not met.

Conclusion

The Fire Water System Program is an existing program that is based on periodic inspections and functional testing of sprinklers, nozzles, fittings, valves, hydrants (including hose and gaskets), hose stations, standpipes, and aboveground and underground piping and components. The program has been effective in monitoring fire water system components and no adverse trends or significant conditions related to these components have been identified.

Implementation of the enhanced Fire Water System Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.17 Flow-Accelerated Corrosion Program

Program Description

The Flow-Accelerated Corrosion (FAC) Program is a condition monitoring program based on the Electric Power Research Institute (EPRI) guidelines in Nuclear Safety Analysis Center (NSAC)-202L-R2 for carbon steel and bronze components containing high-energy single phase or two phase fluids. The program manages loss of material due to flow-accelerated corrosion in piping and components by (a) conducting an analysis to determine critical locations, (b) performing baseline inspections to determine the extent of thinning at these locations, and (c) performing follow-up inspections to confirm the predictions of the rate of thinning, or repairing or replacing components as necessary. This program complies with PINGP's response to NRC Generic Letter 89-08.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Flow-Accelerated Corrosion Program is an existing program. It is consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M17, Flow-Accelerated Corrosion.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

A review of operating experience for the FAC Program identified no adverse trends or issues with program performance. Wall thinning has been identified, and the associated components replaced, prior to causing any significant impact to safe operation or loss of intended functions. The review of operating experience indicates the FAC Program is effective in monitoring and detecting degradation and taking effective corrective actions as needed when acceptance criteria are not met.

Conclusion

The Flow-Accelerated Corrosion Program is an existing program for carbon steel and bronze components containing high-energy single phase or two phase fluids. The program has been effective in predicting, detecting, and monitoring components for FAC; and no adverse trends or significant conditions related to these components have been identified.

Implementation of the Flow-Accelerated Corrosion Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.18 Flux Thimble Tube Inspection Program

Program Description

The Flux Thimble Tube Inspection Program is a condition monitoring program that manages loss of material due to wear for in-core instrument thimble tubes. The program requires periodic eddy current testing of thimble tubes for thinning of the flux thimble tube wall due to flow-induced fretting. The program also provides for evaluation and trending of inspection results and appropriate corrective actions. This program implements the PINGP commitments made in response to NRC Bulletin 88-09, “Thimble Tube Thinning in Westinghouse Reactors.”

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Flux Thimble Tube Inspection Program is an existing program. It will be enhanced to be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M37, Flux Thimble Tube Inspection.

Exceptions to NUREG-1801

None

Enhancements

The following enhancements are required to satisfy NUREG-1801 aging management program recommendations. Enhancements will be implemented prior to the period of extended operation.

- Monitoring and Trending

  The program will require that the interval between inspections be established such that no flux thimble tube is predicted to incur wear that exceeds the established acceptance criteria before the next inspection.

  The program will also require that re-baselining of the examination frequency be justified using plant-specific wear rate data unless prior plant-specific NRC acceptance for the re-baselining was received. If design changes are made to use more wear-resistant thimble tube materials, sufficient inspections will be conducted at an adequate inspection frequency for the new materials.

- Corrective Actions

  The program will require that flux thimble tubes that cannot be inspected must be removed from service.

Operating Experience

A review of operating experience for the Flux Thimble Tube Inspection Program identified no adverse trends or issues with program performance. No thimble tubes have had a through-wall leak at PINGP. PINGP has capped one thimble tube in Unit 2. In 2002 a thimble tube in Unit 1 exhibited a significant increase in new wear and was capped to reduce the risk of leaking; however, the wear rate later stabilized and the thimble tube was subsequently uncapped. Thimble tubes have been replaced in both Units 1 and 2; however the reason was due to difficulty in the movement of the incore instrumentation detectors and was not age-related.

The Flux Thimble Tube Inspection Program effectively monitors the condition of the pressure retaining components within the License Renewal boundary and ensures aging effects are acceptably managed.

Conclusion

The Flux Thimble Tube Inspection Program is an existing program which manages loss of material due to wear for the flux thimble tubes. The program has been effective in monitoring for unacceptable degradation and ensuring that aging effects are managed.

Implementation of the Flux Thimble Tube Inspection Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.19 Fuel Oil Chemistry Program

Program Description

The Fuel Oil Chemistry Program manages the aging effects of loss of material and cracking on internal surfaces of the diesel fuel oil system piping, piping components and tanks by minimizing the potential for a corrosive environment, and by verifying that the actions taken to mitigate corrosion are effective. The program includes: (1) periodic sampling and testing of stored fuel oil and testing of new fuel oil in accordance with plant Technical Specifications and selected industry standards (e.g., ASTM D 975, D 1796, D 4057, and D 6217) to confirm water, sediment and contaminants remain below limits of concern for corrosion to occur; (2) periodic testing of fuel oil storage tanks for the presence of water; (3) periodic integrity testing of underground storage tanks and external visual inspections of aboveground storage tanks to confirm leakage is not occurring; and, (4) one-time inspections of selected tank bottom and piping locations, using ultrasonic testing, to be performed prior to the period of extended operation. These activities verify the absence of unacceptable aging effects and assure the continued effectiveness of fuel oil chemistry control activities to ensure that significant degradation is not occurring and the component intended functions will be maintained during the period of extended operation.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Fuel Oil Chemistry Program is an existing program. It will be enhanced to be consistent, with exceptions, to the recommendations of NUREG-1801, Chapter XI, Program XI.M30, Fuel Oil Chemistry.

Exceptions to NUREG-1801

Program Elements Affected

- Preventive Actions

Periodic fuel oil sampling from the day tanks and clean fuel oil leakage collection tanks of the diesel generators, and the day tanks of the diesel cooling water pumps and the diesel fire pump, is not performed. The very high turnover rate for the fuel in the day tanks, and the close control of the fuel oil quality in the storage tanks that comprise the sources for the day and leakage collection tanks, make periodic sampling unnecessary. The leakage collection tanks are very small and their interiors are not reasonably accessible. Tank internal inspections and wall thickness measurements that have been completed have shown no degradation.

Periodic draining and cleaning of the storage, day, and leakage collection tanks are not performed. The very high turnover rate for the fuel in the day tanks, and the close control of the fuel oil quality in the storage tanks that comprise the sources for the day and leakage collection tanks, make periodic draining and cleaning unnecessary. The leakage collection tanks are very small and their interiors are not reasonably accessible. Tank internal inspections and wall thickness measurements that have been completed have shown no degradation. Draining and cleaning of the tanks would be performed only if determined necessary based on negative trends indicated by the results of the fuel oil analyses, results of periodic testing for the presence of water, and plant or industry operating experience.

Biocides, stabilizers, or corrosion inhibitors are not added to the fuel oil. Operating experience has not indicated a need for such fuel oil additives. Fuel oil samples have not shown cloudiness, sludge, or other conditions that would indicate significant biological activity or fuel degradation, and the tank inspections that have been performed have not shown any significant internal corrosion activity. Internal coatings are also not used nor credited for preventing internal tank corrosion. The combination of fuel oil quality standards, fuel oil quality sampling trends which routinely show fuel oil to meet the acceptance criteria of ASTM D 975-77, the high rate of fuel oil turnover and replenishment in the tanks, and plant operating experience have shown that the additional preventive actions of coatings or fuel oil additives are not required.

- Monitoring and Trending

Particulate contamination testing of fuel oil will be performed annually and not quarterly. Annual testing is sufficiently frequent to verify that particulates are not forming. The absence of previous particulate contamination during routine historical sampling and analysis, and the practice of quarantining new fuel deliveries in isolated tanks until sampling and analysis are complete, provide robust safeguards to prevent particulate contamination in storage tanks.

Enhancements

The following enhancements are required to satisfy NUREG-1801 aging management program recommendations. Enhancements will be implemented prior to the period of extended operation.

- Monitoring and Trending

  Particulate contamination testing of fuel oil in the eleven fuel oil storage tanks in scope of License Renewal will be performed, in accordance with ASTM D 6217, on an annual basis.

- Detection of Aging Effects

  One-time ultrasonic thickness measurements will be performed at selected tank bottom and piping locations prior to the period of extended operation.

Operating Experience

The Fuel Oil Chemistry Program has been effective in monitoring and controlling diesel fuel oil chemistry to mitigate aging effects. Based on a review of the site Corrective Action Program, the plant has taken timely and effective corrective action to address diesel fuel oil quality concerns and diesel fuel oil system performance issues when requirements were not met. Fuel oil quality parameters, including water and sediment percentage, are routinely within acceptance limits at the various monitored locations and no adverse trends have been identified. Some examples were noted where fuel oil shipments did not meet quality standards and the fuel oil was not placed in service. Periodic external visual walkdown inspections of the aboveground and vaulted tanks, and pressure integrity testing results for the underground storage tanks, have not identified any signs of leakage that would indicate a concern with tank wall integrity. The internal visual inspections of storage tank surfaces that have been performed identified no significant corrosion, pitting, or areas requiring repair due to aging effects or unacceptable fuel oil chemistry control. Ultrasonic testing of one tank was performed in 1995 and no wall thinning due to corrosion was detected. Therefore, consistent with NUREG-1801, no instances of fuel oil system component failures to perform License Renewal intended functions attributed to contamination have been identified.

Conclusion

The Fuel Oil Chemistry Program is an existing program that implements Technical Specifications requirements; ASTM standards; vendor and plant requirements for fuel oil chemistry; and piping, piping component and tank inspections. The program has been effective in controlling fuel oil chemistry, preventing the use of fuel oil not meeting specifications, minimizing the potential for corrosion, and periodically demonstrating storage tank integrity.

Implementation of the enhanced Fuel Oil Chemistry Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.20 Fuse Holders Program

Program Description

The Fuse Holders Program is a condition monitoring program that implements periodic visual inspections and tests on fuse holders in scope of License Renewal, located in passive enclosures and assemblies, and exposed to environments that potentially could lead to electrical circuit failures if left unmanaged. The AMP for fuse holders (metallic clamps) manages the effects of aging from adverse localized environments caused from the following aging stressors, as applicable: fatigue, mechanical stress, vibration, chemical contamination, and corrosion.

The identified fuse holders are reviewed, inspected and/or tested to determine if they are exposed to adverse localized environments that could adversely affect the electrical circuit (metallic connection with the fuse) if left unmanaged during the period of extended operation. A localized environment is adverse if it promotes loose connections from clip relaxation/fatigue (ohmic heating, thermal cycling or electrical transients, mechanical fatigue caused by frequent removal/replacement of the fuse, or vibration), or if it exposes the fuse holder to adverse levels of chemical contamination or moisture that would promote corrosion and oxidation of the metallic fuse clips.

Fuse holders determined to be operating in an adverse localized environment will be visually inspected and tested at least once every 10 years. The first visual inspections and tests will be completed before the period of extended operation. The specific type of test to be performed will be determined prior to the initial test, and is to be a proven test for detecting deterioration of metallic clamps of the fuse holders, such as thermography, contact resistance testing, or other appropriate testing.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Fuse Holders Program is a new program. It will be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.E5, Fuse Holders.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Fuse Holders Program is a new program, and, therefore, has no operating experience related to program implementation. A review of plant-specific operating experience was conducted, and no fuse connection failures from potential age-related causes were identified. The plant operating experience review did identify fuse enclosure issues involving water intrusion from event driven causes (e.g., water leaked into conduit and emptied into enclosure). These moisture intrusion events for enclosures exposed to this adverse localized environment could promote a corrosive environment for the metallic contact surfaces, leading to increased contact resistance and circuit failure if left unmanaged.

Inspections and testing (thermography) were performed on fuse holders in scope of License Renewal in terminal boxes and junction boxes located outside Containment. This initial inspection and testing revealed that some enclosures had significant signs of oxidation that could adversely affect the fuse holders if not repaired or reworked. The conditions were entered into the Corrective Action Program for disposition. For adverse aging environments, this program will ensure the integrity of fuse holders in scope of License Renewal and located in passive enclosures during the period of extended operation.

Conclusion

The Fuse Holders Program is a new program that implements periodic inspections and tests on fuse holders in scope of License Renewal, located in passive enclosures and assemblies, and exposed to adverse localized environments that potentially could challenge the electrical circuit integrity.

Implementation of the Fuse Holders Program provides reasonable assurance that aging effects will be managed such that electrical commodities within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

This program will be implemented prior to the period of extended operation.

B2.1.21 Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program

Program Description

The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program performs periodic tests to provide an indication of the condition of the conductor insulation for medium voltage cables in scope of License Renewal exposed to adverse localized environments (i.e., periods of high moisture greater than a few days at a time) and subjected to voltage stress (energized greater than 25 percent of the time). PINGP has taken the position that underground cables (direct buried or in underground ducts) not designed for wet environments may have been exposed to high moisture conditions for greater than a few days at a time, and once exposed to periods of high moisture, the cable insulation may retain moisture regardless of moisture changes in underground ducts or earth. Therefore, insulation testing for the cables meeting these conditions will be performed at least once every 10 years. The first tests for License Renewal are to be completed before the period of extended operation.

In addition, periodic inspections of the underground medium voltage cable manhole for the accumulation of water (and draining if necessary) will be conducted to minimize prolonged moisture conditions that promote the growth of water trees. The inspection frequency will be based on actual plant experience with water accumulation in the manhole. However, the inspection frequency will be at least once every two years. The first inspection for License Renewal will be completed before the period of extended operation.

This program considers the technical guidance provided in NUREG/CR-5643, IEEE Std. P1205, SAND96-0344, and EPRI TR-109619.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new program. It will be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.E3, Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new program, and therefore, has no operating experience related to program implementation. A review of applicable plant operating experience did reveal cases of underground cable problems that resulted in corrective actions. In its response to NRC Generic Letter 2007-01, “Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients,” dated February 7, 2007, PINGP reported that three underground medium voltage power cable failures had occurred (two circuit failures - one from lightning strike, the other from water intrusion; and one megger test failure).

Conclusion

The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new program that implements periodic tests on underground non-EQ medium voltage cables and connections in scope of License Renewal, and exposed to the conditions that promote the growth of water trees.

Implementation of the Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program provides reasonable assurance that aging effects will be managed such that electrical cables and connections within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

This program will be implemented prior to the period of extended operation.

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

Program Description

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program is a condition monitoring program that performs visual inspections of the internal surfaces of mechanical components within the scope of License Renewal not covered by other AMPs. The internal inspections are performed during scheduled preventive and corrective maintenance activities, or during other routinely scheduled tasks such as surveillance procedures, when internal surfaces are made accessible for inspections. The program inspections are performed to provide assurance that existing environmental conditions are not resulting in degradation that could result in a loss of component intended functions. The program manages the effects of loss of material and cracking.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program is a new program. It will be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M38, Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program is a new program, and therefore, has no operating experience related to program implementation. A review of plant-specific operating experience has revealed some examples of corrosion and erosion-corrosion on component internal surfaces. Appropriate corrective actions were taken.

Both plant and industry operating experience will be used to establish inspection intervals, inspection techniques, and inspection locations. Plant maintenance history will provide insight in the selection of inspection locations likely to exhibit the expected aging effects. After program implementation has begun, plant-specific operating experience (including program inspection results) will be routinely evaluated for new insights and lessons learned.

Conclusion

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program is a new program that implements internal inspections of mechanical components within the scope of License Renewal made available for inspection during routine activities.

Implementation of the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

This program will be implemented prior to the period of extended operation.

B2.1.23 Inspection of Overhead Heavy Load and LIght Load (Related to Refueling) Handling Systems Program

Program Description

The Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program is a condition monitoring program that ensures structural components of load handling systems within the scope of License Renewal are capable of sustaining their rated loads for the period of extended operation. The load handling components in scope of License Renewal are overhead heavy load handling components subject to the requirements of NUREG-0612, and light load handling components associated with refueling activities. The program provides for periodic visual inspections of structural components including crane rails, structural girders, beams, special lifting devices, and welded and bolted connections.

The program provides for periodic visual inspections in support of load handling systems to include the following:

- Containment polar cranes load-carrying components
- Turbine building cranes load-carrying components
- Auxiliary building crane load-carrying components
- Spent fuel pool bridge crane load-carrying components
- Special lifting devices
- Manipulator cranes load-carrying components
- Fuel transfer system conveyer car load-carrying components
- Fuel transfer tipping devices load-carrying components
- Crane above the safeguard traveling screens load-carrying components

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program is an existing program. It will be enhanced to be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M23, Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems.

Exceptions to NUREG-1801

None

Enhancements

The following enhancements are required to satisfy NUREG-1801 aging management program recommendations. Enhancements will be implemented prior to the period of extended operation.

- Scope of Program

  Program implementing procedures will be revised to ensure the components and structures subject to inspection are clearly identified.

- Parameters Monitored/Inspected

  Inspection procedures will be enhanced to include the parameters corrosion and wear where omitted.

Operating Experience

Plant operating experience was used to identify aging effects and mechanisms for the Cranes, Heavy Loads, and Fuel Handling System. The operating experience review showed that examples of paint damage and corrosion in load handling systems had been identified and corrected prior to loss of intended functions. Crane inspections also identified one cracked weld in a turbine building crane girder diaphragm plate. Appropriate corrective actions were taken. The Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program has been effective in monitoring and detecting degradation and taking effective corrective actions.

Conclusion

The Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program is an existing program that manages the aging effect loss of material due to corrosion and wear for crane rails, structural girders, beams, special lifting devices, and welded and bolted connections of load handling systems within the scope of License Renewal.

Implementation of the enhanced Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.24 Lubricating Oil Analysis Program

Program Description

The Lubricating Oil Analysis Program obtains and analyzes lubricating and hydraulic oil samples from plant equipment to ensure that the oil quality is maintained within established limits. The program maintains oil contaminants (primarily water and particulates which may be indicative of inleakage and corrosion product buildup) within acceptable limits to preserve an operating environment that is not conducive to loss of material, cracking, or heat transfer degradation. Oil testing activities include periodic sampling, analysis, and trending of results. The program provides for evaluation of oil sample results and appropriate corrective actions. The Lubricating Oil Analysis Program provides an early indication of an adverse equipment condition in lubricating and hydraulic oil environments.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Lubricating Oil Analysis Program is an existing program. It is consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M39, Lubricating Oil Analysis Program.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

A review of the PINGP operating experience related to the Lubricating Oil Analysis Program indicates that the program has been effective in preventing component failures due to oil contamination or degradation. Some instances have been identified in which oil samples contained water or particulate contamination in excess of the established limits. Appropriate actions were taken in accordance with the Corrective Action Program to correct the identified conditions. No instances of component failures attributed to lubricating oil contamination or degradation have been identified.

Conclusion

The Lubricating Oil Analysis Program is an existing program that implements manufacturer's recommendations, industry standards, and plant requirements for oil quality and acceptance criteria to monitor for potential degradation of equipment. The program has been effective in controlling oil quality, preventing the use of oil not meeting quality standards, and minimizing the potential for corrosion.

Implementation of the Lubricating Oil Analysis Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.25 Masonry Wall Program

Program Description

The Masonry Wall Program is a condition monitoring program that is based on NRC IE Bulletin 80-11, “Masonry Wall Design” and the guidance provided in NRC Information Notice 87-67, “Lessons Learned from Regional Inspections of Licensee Actions in Response to IE Bulletin 80-11.” The program manages cracking of masonry walls in proximity to, or having attachments to, safety related equipment by conducting periodic visual inspections.

The Masonry Wall Program manages the aging effect of cracking in masonry walls so that the evaluation basis established for each masonry wall within the scope of License Renewal remains valid through the period of extended operation. Administrative controls are in place to ensure any reclassification of masonry walls (i.e., for newly added wall attachments, safety related equipment routed in the vicinity of the wall, etc.) are evaluated in accordance with the requirements of IE Bulletin 80-11.

Structural steel supports are incorporated in the masonry wall design where required by analyses. Steel supports and steel bracing of masonry walls in scope of License Renewal are inspected as part of the Structures Monitoring Program.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Masonry Wall Program is an existing program. It is consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.S5, Masonry Wall Program.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

A review of operating experience related to the Masonry Wall Program revealed that numerous PINGP inspections of structural components have been documented. The inspections have identified minor cracking that was found to be acceptable as-is without repair. Other issues unrelated to aging have also been identified and resolved.

The review of operating experience indicates the Masonry Wall Program is effective in monitoring and detecting degradation and taking effective corrective actions as needed when acceptance criteria are not met.

Conclusion

The Masonry Wall Program is an existing program that monitors the condition of masonry walls within the scope of License Renewal through periodic visual inspections.

Implementation of the Masonry Wall Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended functions during the period of extended operation.

B2.1.26 Metal-Enclosed Bus Program

Program Description

The Metal-Enclosed Bus Program is a condition monitoring program that inspects representative samples of the interiors of non-segregated 4160V phase bus between station offsite source auxiliary transformers and plant buses. Internal visual inspection is performed to observe signs of aging of the bus insulation materials (such as cracking and discoloration), evidence of loose connections, and signs of moisture and debris intrusion. Internal bus supports are visually examined for structural integrity and signs of cracks. The inspection may also include thermography and/or electrical resistance testing to ensure the integrity of bus connections. The program manages the aging effect of reduction of insulation resistance in insulation components, loose connections, and corrosion from moisture/debris intrusion in non-segregated bus ducts. The interior visual inspection will be conducted at least once every five years, or, if conducted with thermography or electrical resistance testing, at least once every ten years. The first inspections and/or tests will be completed before the period of extended operation.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Metal-Enclosed Bus Program is a new program. It will be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.E4, Metal-Enclosed Bus.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Metal Enclosed Bus Program is a new program, and therefore, has no operating experience related to program implementation. A review of plant operating experience reveals that previous periodic inspections of bus ducts have identified degraded components that were repaired/replaced to preclude electrical failures.

Conclusion

The Metal-Enclosed Bus Program is a new program that implements periodic inspections and tests on non-segregated bus ducts in scope of License Renewal.

Implementation of the Metal-Enclosed Bus Program provides reasonable assurance that aging effects will be managed such that the non-segregated bus ducts within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

This program will be implemented prior to the period of extended operation.

B2.1.27 Nickel-Alloy Nozzles and Penetrations Program

For the Nickel-Alloy Nozzles and Penetrations Program, PINGP is providing a commitment to the following activities for managing the aging of nickel-alloy components susceptible to primary water stress corrosion cracking:

1. comply with applicable NRC orders, and
2. implement applicable NRC Bulletins, Generic Letters, and staff-accepted industry guidelines.

This commitment is included in LRA Appendix A (USAR Supplement) for incorporation into the USAR.

B2.1.28 Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program

Program Description

The Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program (Nickel-Alloy Vessel Head Penetration Nozzle Program) is a condition monitoring program that implements the requirements of the NRC First Revised Order EA-03-009, “Issue of Order Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors,” dated February 20, 2004 (Order). This program manages the aging effects of cracking due to primary water stress corrosion cracking (PWSCC) of the nickel-alloy vessel head penetration nozzles welded to the upper reactor vessel head. In addition the program monitors the upper reactor vessel head surface and the region above the reactor vessel head for boric acid leakage.

This program is a mandated augmented inservice inspection program that supplements the leakage tests and visual VT-2 examinations required by ASME Section XI, Table IWB-2500-1, Examination Category B-P. The program incorporates the susceptibility ranking of the upper vessel head penetration nozzles to PWSCC, and the required process for establishing the inspection methods and inspection frequencies in accordance with the susceptibility ranking, as required by the Order, as amended.

The upper reactor vessel heads for both Units 1 and 2 have been replaced. The new heads now incorporate Nickel-Alloy 690 (SB167) for each of the reactor head penetration nozzles instead of the Nickel-Alloy 600 utilized in the previous heads.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program is an existing program. It will be enhanced to be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M11A, Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors.

Exceptions to NUREG-1801

None

Enhancements

The following enhancements are required to satisfy NUREG-1801 aging management program recommendations. Enhancements will be implemented prior to the period of extended operation.

- Detection of Aging Effects

  The program will require that any deviations from implementing the appropriate required inspection methods of the NRC First Revised Order EA-03-009, “Issue of Order Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors,” dated February 20, 2004 (Order), as amended, will be submitted for NRC review and approval in accordance with the Order, as amended.

- Monitoring and Trending

  The program will require that any deviations from implementing the required inspection frequencies mandated by the Order, as amended, will be submitted for NRC review and approval in accordance with the Order, as amended.

- Acceptance Criteria

  Relevant flaw indications detected during the augmented inspections of the upper vessel head penetration nozzles will be evaluated in accordance with the criteria provided in the letter from Mr. Richard Barrett, NRC, Office of Nuclear Reactor Regulation (NRR), Division of Engineering to Alex Marion, Nuclear Energy Institute (NEI), dated April 11, 2003, or in accordance with NRC-approved Code Cases that incorporate the flaw evaluation procedures and criteria of the NRC's April 11, 2003, letter to NEI.

- Corrective Actions

  The program will require that, if leakage or evidence of cracking in the vessel head penetration nozzles (including associated J-groove welds) is detected while ranked in the “Low,” “Moderate,” or “Replaced” susceptibility category, the nozzles are to be immediately reclassified to the “High” susceptibility category and the required augmented inspections for the “High” susceptibility category are to be implemented during the same outage the leakage or cracking is detected.

Operating Experience

The upper reactor vessel heads for both Units 1 and 2 have been replaced. The Unit 1 head was replaced during the 1R24 refueling outage in 2006 and the Unit 2 head was replaced during the 2R23 refueling outage in 2005. The new heads now incorporate

Nickel-Alloy 690 (SB167) for each of the reactor head penetration nozzles instead of the Nickel-Alloy 600 utilized in the previous heads. Inspections for the upper reactor vessel head surface, each nickel-alloy reactor head penetration nozzle, and the region above the reactor vessel head are being implemented in accordance with the requirements of the NRC First Revised Order EA-03-009 dated February 20, 2004.

A review of operating experience for the Nickel-Alloy Vessel Head Penetration Nozzle Program identified no adverse trends or issues with program performance. A few minor non-relevant leaks from valves were identified and corrected prior to causing any significant impact to safe operation or loss of intended functions. Adequate corrective actions were taken to prevent recurrence.

The review of operating experience indicates the Nickel-Alloy Vessel Head Penetration Nozzle Program has been effective in monitoring and detecting degradation and taking effective corrective actions as needed when acceptance criteria are not met.

Conclusion

The Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program is an existing program that manages the effects of cracking due to PWSCC of the nickel-alloy vessel head penetration nozzles welded to the upper reactor vessel head. In addition the program provides for condition monitoring of the upper reactor vessel head surface and the region above the reactor vessel head for boric acid leakage.

Implementation of the Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.29 One-Time Inspection Program

Program Description

The One-Time Inspection Program provides additional assurance, through sampling inspections using nondestructive examination (NDE) techniques, that aging is not occurring or that the rate of degradation is so insignificant that additional aging management actions are not warranted. The program includes measures to verify the effectiveness of other AMPs, such as the Water Chemistry Program, to mitigate aging effects. In other cases, this program confirms that a separate AMP is not warranted when significant aging is not expected to occur. If aging effects are identified that could adversely impact an intended function prior to the end of the period of extended operation, additional actions will be taken to correct the condition, perform additional inspections, and/or perform periodic inspections, as needed.

Program elements include: (a) determination of the sample size based on an assessment of materials of fabrication, environment, plausible aging effects, and operating experience; (b) identification of inspection locations in the system, component, or structure based on the aging effect; (c) determination of the examination technique, including acceptance criteria that would be effective in managing the aging effect that is being examined; and (d) evaluation of the need for follow-up examination if degradation is identified that could jeopardize an intended function prior to the end of the period of extended operation. The program must be implemented prior to the period of extended operation and should only rely on the results of inspections performed within the 10-year period preceding the period of extended operation. This program expires at the time of entry into the period of extended operation.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant One-Time Inspection Program is a new program. It will be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M32, One-Time Inspection.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The One-Time Inspection Program is a new program, and therefore, has no operating experience related to program implementation. For discussions of operating experience related to the programs whose effectiveness is being verified by one-time inspections (i.e., Water Chemistry, Fuel Oil Chemistry, and Lubricating Oil Analysis Programs), the LRA Appendix B descriptions of these programs should be consulted. Both plant and industry operating experience will be used to establish sample size, inspection locations, and examination techniques for inspections under this program.

Conclusion

The One-Time Inspection Program is a new program that implements sampling inspections to verify the effectiveness of selected AMPs, such as the Water Chemistry Program.

Implementation of the One-Time Inspection Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

This program will be completed prior to the period of extended operation.

B2.1.30 One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program

Program Description

The One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program (Class 1 Small-Bore Piping Program) is a condition monitoring program that provides additional assurance that aging of Class 1 small-bore piping either is not occurring or is insignificant, such that a new plant-specific AMP is not warranted.

The Class 1 Small-Bore Piping Program inspects for the presence of cracking by performing one-time volumetric examinations on a sample of butt welds in Class 1 piping (including pipes, fittings, and branch connections) less than 4-inch nominal pipe size. The one-time inspections are performed at locations that are determined to be potentially susceptible to cracking, based on the methodology of the site-specific, NRC approved, Risk Informed Inservice Inspection Program.

Based upon a review of previous operating experience, PINGP has not experienced cracking of ASME Code Class 1 small-bore piping. If evidence of aging-related cracking is identified through the implementation of the Class 1 Small-Bore Piping Program, a periodic inspection program will be implemented to manage applicable aging effects during the period of extended operation.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program is a new program. It will be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M35, One-Time Inspection of ASME Code Class 1 Small-Bore Piping.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Class 1 Small-Bore Piping Program is a new program, and therefore, has no operating experience related to program implementation. However, both plant and industry operating experience will be used to establish the program. The specific examination techniques utilized are qualified prior to performing the examinations.

Based upon a review of previous operating experience, PINGP has not experienced cracking of ASME Code Class 1 small-bore piping. During the 2006 refueling outages of both Units 1 and 2, UT examinations of ASME Class 1 and 2 small-bore piping welds were performed by the Risk-Informed Inservice Inspection Program. Welds in the Reactor Coolant, Safety Injection, and Chemical and Volume Control Systems were examined. The examination results from both Class 1 and Class 2 piping welds in these systems are relevant to this program, since all three systems are constructed of similar materials and contain borated water with similar chemistry. On Unit 1, inservice UT examinations of 14 welds were performed. On Unit 2, inservice UT examinations of 27 welds were performed. No rejectable indications were detected in either Unit.

Conclusion

The Class 1 Small-Bore Piping Program is a new program that will be effective in determining whether aging of Class 1 small-bore piping either is not occurring, or is insignificant, such that a new AMP is not warranted.

Implementation of the One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program provides reasonable assurance that aging effects will be managed such that the small-bore piping within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

This program will be completed prior to the period of extended operation.

B2.1.31 Open-Cycle Cooling Water System Program

Program Description

The Open-Cycle Cooling Water (OCCW) System Program implements the commitments made in the PINGP response to NRC Generic Letter 89-13, “Service Water System Problems Affecting Safety-Related Equipment,” to ensure that the effects of aging in OCCW systems, and in components serviced by the OCCW systems, will be managed for the period of extended operation. This program manages aging effects associated with metallic components exposed to a raw water environment. These aging effects are due to corrosion, erosion, and fouling (including silting and coating failure). The program includes (a) surveillance and control of fouling, (b) tests to verify heat transfer capabilities, and (c) routine inspection and maintenance activities.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Open-Cycle Cooling Water System Program is an existing program. It is consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M20, Open-Cycle Cooling Water System.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

A review of operating experience for the Open-Cycle Cooling Water System Program identified no adverse trends or issues with program performance. The review revealed a number of examples where equipment issues have been identified and are being managed under the Open-Cycle Cooling Water System Program. These issues include:

- Accumulations of silt, corrosion products, and debris in cooling water piping, valves, and heat exchangers
- Accumulation of biological growth (mussels, clams, and shells) in river cooling water piping and intake bays
- Some instances of MIC causing pitting attack of cooling water piping
- Some instances of heat exchanger tubes requiring plugging due to corrosion

The conditions were identified and corrected prior to causing a significant impact to safe operation or loss of intended functions.

The review of operating experience indicates the Open-Cycle Cooling Water System Program is effective in monitoring and detecting degradation and taking effective corrective actions as needed when acceptance criteria are not met.

Conclusion

The Open-Cycle Cooling Water System Program is an existing program that implements the recommendations of NRC Generic Letter 89-13 to ensure that the effects of aging on raw water systems will be managed for the period of extended operation. This program has been effective in managing aging effects due to corrosion, erosion, and fouling in systems and components serviced by the OCCW systems.

Implementation of the Open-Cycle Cooling Water System Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.32 **PWR Vessel Internals Program**

For the PWR Vessel Internals Program, PINGP is providing a commitment to the following activities for managing the aging of reactor vessel internals components:

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

This commitment is included in LRA Appendix A (USAR Supplement) for incorporation into the USAR.

B2.1.33 **Reactor Head Closure Studs Program**

Program Description

The Reactor Head Closure Studs Program is a condition monitoring program that implements inservice inspection of reactor vessel head closure studs. The program is implemented in accordance with the requirements of 10 CFR 50.55a, with specified limitations, modifications, and NRC-approved alternatives, and utilizes the 1998 Edition of ASME Section XI including the 1998, 1999, and 2000 Addenda for the current inspection interval. Inspections are in accordance with Subsection IWB, Table IWB-2500-1, Examination Category B-G-1 of the ASME Section XI edition and addenda of record.

The program also includes preventive measures to mitigate cracking. Preventive measures include proper material selection, avoiding the use of metal-plated stud bolting, and controlling the use of surface treatments and lubricants. As specified in NRC Regulatory Guide 1.65, only approved lubricants are used.

The program is updated periodically as required by 10 CFR 50.55a.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Reactor Head Closure Studs Program is an existing program. It will be enhanced to be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M3, Reactor Head Closure Studs.

Exceptions to NUREG-1801

None

Enhancements

The following enhancement is required to satisfy NUREG-1801 aging management program recommendations. The enhancement will be implemented prior to the period of extended operation.

- Corrective Actions

  Controls will be put in place to ensure that any future procurement of reactor head closure studs will be in accordance with the material and inspection guidance provided in NRC Regulatory Guide 1.65.

Operating Experience

A review of plant operating experience for the Reactor Head Closure Studs Program did not identify any adverse trend in program performance. Cracking of the head studs from SCC or loss of material due to wear has not occurred. However, some occurrences of mechanical damage due to mishandling have been identified. Minor nicks, scratches, gouges, and thread damage have occurred due to maintenance activities during refueling outages. This damage was considered normal wear, and the studs were determined to be acceptable for continued service. There have been no deficiencies attributed to distortion or plastic deformation from stress relaxation.

The experience at PINGP with the Reactor Head Closure Studs Program shows that the program is effective in managing cracking due to SCC or loss of material due to wear, and also detecting reactor coolant leakage associated with the closure bolting.

Conclusion

The Reactor Head Closure Studs Program is an existing program which provides for preventive measures and condition monitoring of the reactor head closure stud bolting. The program has been effective in monitoring the reactor head closure bolting and no adverse trends or significant conditions related to the reactor head closure stud bolting have been identified.

Implementation of the enhanced Reactor Head Closure Studs Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.34 Reactor Vessel Surveillance Program

Program Description

The Reactor Vessel Surveillance Program manages the reduction of fracture toughness due to neutron embrittlement of the low alloy steel reactor vessels. The program ensures that reactor vessel materials meet the requirements of 10 CFR 50.60 for fracture prevention and 10 CFR 50.61 for Pressurized Thermal Shock (PTS). This program includes surveillance capsule removal and specimen mechanical testing/evaluation, radiation analysis, development of pressure-temperature operating limits, and determination of low-temperature overpressure protection setpoints. Withdrawn untested capsules placed in storage are maintained for future insertion. Monitoring methods are in accordance with 10 CFR 50, Appendix H. Fracture toughness is in accordance with 10 CFR 50, Appendix G. In addition, the program complies with Regulatory Guide 1.99 and ASTM E-185.

The Reactor Vessel Surveillance Program manages updates of pressure-temperature operating limitations and the surveillance specimen withdrawal schedule, as needed, consistent with plant Technical Specifications, the Pressure and Temperature Limits Report, and 10 CFR 50.60 and 10 CFR 50, Appendix H.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Reactor Vessel Surveillance Program is an existing program. It will be enhanced to be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M31, Reactor Vessel Surveillance.

Exceptions to NUREG-1801

None

Enhancements

The following enhancements are required to satisfy NUREG-1801 aging management program recommendations. Enhancements will be implemented prior to the period of extended operation.

- Scope of Program

  A requirement will be added to the program to ensure that all withdrawn and tested surveillance capsules, not discarded as of August 31, 2000, are placed in storage for possible future reconstitution and use.

- Parameters Monitored/Inspected

  A requirement will be added to the program to ensure that in the event spare capsules are withdrawn, the untested capsules are placed in storage and maintained for future insertion.

Operating Experience

A review of operating experience for the Reactor Vessel Surveillance Program identified no adverse trends or issues with program performance. The Reactor Vessel Surveillance Program has been effective in monitoring and evaluating vessel material aging effects due to neutron irradiation embrittlement.

Maximum reactor vessel fluence has been projected to the end of the period of extended operation, or 54 EFPY, based on a 90% capacity factor. Upper-shelf energy projections indicate that all vessel beltline materials will maintain projected upper-shelf energy values greater than 50 ft-lbs up to 54 EFPY. The PTS reference temperatures (RT_{PTS}) are projected to be below the screening criteria of 270°F for longitudinal welds, plates and forgings and 300°F for circumferential welds for the beltline materials at 54 EFPY.

Conclusion

The Reactor Vessel Surveillance Program is an existing program which manages the reduction of fracture toughness due to neutron embrittlement of the low alloy steel reactor vessels. The program complies with the requirements of 10 CFR 50.60, 10 CFR 50.61, 10 CFR 50, Appendices G and H, Regulatory Guide 1.99 and ASTM E-185.

Implementation of the Reactor Vessel Surveillance Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.35 RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program

Program Description

The RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program manages aging effects in water-control structures and components, including bolting, through periodic visual inspections and hydrographic surveys. The program addresses age-related degradation as well as degradation due to extreme environmental conditions and the effects of natural phenomena. Program elements include guidance on inspection scope, aids to facilitate the inspection process, criteria used to evaluate the inspection results, guidance on inspection frequency, and documentation requirements. Structures included within the scope of the program are the Screenhouse, Emergency Cooling Water Intake (crib), Intake Canal, and Approach Canal. Periodic inspection and monitoring activities are performed to ensure water-control structures remain capable of performing their intended function through early detection and timely correction of degraded conditions prior to loss of any intended function.

This program does not constitute a commitment to the guidance of NRC RG 1.127. RG 1.127 focuses on dams, reservoirs behind those dams, and dam safety and outlet works that deliver cooling water from reservoirs and spill excess water to prevent dam overtopping. These components are not within the scope of License Renewal at PINGP. However, the program considers the guidance in NRC RG 1.127 and ACI 349.3R-96 if it is necessary to evaluate degradation mechanisms and questionable concrete conditions.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program is an existing program. It will be enhanced to be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.S7, RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants.

Exceptions to NUREG-1801

None

Enhancements

The following enhancements are required to satisfy NUREG-1801 aging management program recommendations. Enhancements will be implemented prior to the period of extended operation.

- Scope of Program

  The scope of the program will be enhanced to add inspections of concrete and steel components that are below the water line at the Screenhouse and Intake Canal. The scope will also be enhanced to require inspections of the Approach Canal, Intake Canal, Emergency Cooling Water Intake, and Screenhouse immediately following extreme environmental conditions or natural phenomena including an earthquake, flood, tornado, severe thunderstorm, or high winds.

- Parameters Monitored/Inspected

  The program parameters inspected will be enhanced to include an inspection of water-control concrete components that are below the water line for cavitation and erosion degradation. The program will also be enhanced to visually inspect for damage such as cracking, settlement, movement, broken bolted and welded connections, buckling, and other degraded conditions following extreme environmental conditions or natural phenomena

Operating Experience

A review of operating experience related to the RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program indicates the program has been effective in ensuring that structures or components remain capable of performing their intended function. Issues have been identified, and corrective actions taken, for minor degradation of items such as gasket materials, grout and bolting. As an example, during an inspection of the Screenhouse in 1997, minor calcium deposits, a concrete spall, and minor wall cracks were observed. The spall was repaired and the calcium deposit and cracks were determined to be non-active and not a structural concern.

Conclusion

The RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program is an existing program that monitors the condition of water-control structures and components, including bolting.

Implementation of the enhanced RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended functions during the period of extended operation.

B2.1.36 Selective Leaching of Materials Program

Program Description

The Selective Leaching of Materials Program ensures the integrity of components in scope of License Renewal which may be subject to selective leaching. The program performs a one-time visual inspection in conjunction with a hardness measurement, or other suitable detection technique, of selected components made of cast iron, copper alloys >15% zinc, and copper-nickel, in environments conducive to selective leaching. Through inspections of representative samples, the program will determine if selective leaching is occurring and, if found, whether the aging mechanism will affect the ability of the component to perform its intended function.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Selective Leaching of Materials Program is a new program. It will be consistent, with exceptions, to the recommendations of NUREG-1801, Chapter XI, Program XI.M33, Selective Leaching of Materials.

Exceptions to NUREG-1801

Program Elements Affected

- Scope of Program, Parameters Monitored/Inspected, Detection of Aging Effects

  Alternative detection techniques may be used instead of, or in addition to, visual inspection and hardness testing for the detection of selective leaching. NUREG-1801 specifies use of only visual inspection and hardness testing. Visual inspection and hardness measurement may not be feasible due to component configuration and location. In addition, other available detection techniques (e.g., mechanical scraping, chipping), and additional examination methods that become available to the nuclear industry, may be shown to be at least as effective as visual inspection and hardness testing in detecting and assessing the extent of selective leaching.

Enhancements

None

Operating Experience

The Selective Leaching of Materials Program is a new program to be implemented prior to the period of extended operation and, therefore, has no operating experience related to program implementation. A search of plant operating experience did not reveal any instances of selective leaching having been documented at PINGP in the past. For implementation of this program, however, available plant and industry operating experience will be used to establish sample size, inspection locations, and inspection techniques.

Conclusion

The Selective Leaching of Materials Program is a new program which performs a one-time visual inspection and hardness test, or other suitable detection technique, on selected components that may be susceptible to selective leaching. The one-time examinations will determine whether loss of material due to selective leaching is occurring, and, if found, whether the aging mechanism will affect the ability of the components to perform their intended function(s) for the period of extended operation.

Implementation of the Selective Leaching of Materials Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

This program will be completed prior to the period of extended operation.

B2.1.37 Steam Generator Tube Integrity Program

Program Description

The Steam Generator Tube Integrity Program consists of activities that manage the aging effects cracking, denting, ligament cracking, and loss of material for steam generator tubes, tube plugs, tube repairs, and various secondary side internal components. The Steam Generator Tube Integrity Program is implemented in accordance with Technical Specifications Section 5.5.8 and applicable industry guidance to maintain the integrity of the steam generators. The program manages aging effects through a balance of prevention, inspection, evaluation, repair, and leakage monitoring. Eddy current testing is used to detect steam generator tube flaws and degradation. Visual examinations are conducted on tube plugs, sleeve plugs, and sleeves as necessary. In addition, visual inspections are performed to identify degradation of secondary side steam generator internal components.

The plant Technical Specifications assure timely assessment of tube integrity and compliance with primary-to-secondary leakage limits. Technical Specifications specify steam generator inspection scope, frequency, and acceptance criteria for the plugging and repair of flawed tubes. In addition, the Technical Specifications identify approved tube repair methods. Prairie Island Technical Specifications provide alternate repair criteria for Unit 2 steam generator degradation management.

The Steam Generator Tube Integrity Program follows the guidelines contained in the latest revision of EPRI “PWR Steam Generator Examination Guidelines” which provide criteria for the qualification of personnel, specific techniques, and the associated acquisition and analysis of data, including procedures, probe selection, analysis protocols, and reporting criteria. The program also incorporates the guidance of NEI 97-06, “Steam Generator Program Guidelines,” for performance criteria which pertains to structural integrity, accident-induced leakage, and operational leakage. The program also includes guidance on assessment of degradation mechanisms, inspection, tube integrity assessment, maintenance, plugging, repair, and leakage monitoring, as well as procedures for monitoring and controlling secondary side and primary side water chemistry.

In response to Generic Letter 97-06, PINGP outlined the program in place to detect degradation of steam generator internals and a description of the inspection plans, including the inspection scope, frequency, methods, and equipment. The program demonstrated that the steam generator internals were in compliance with the plant’s current licensing basis.

The Technical Specifications, including alternate repair criteria for Unit 2 steam generator degradation management, PINGP’s response to Generic Letter 97-06, and PINGP’s commitment to implement the Steam Generator Program Guidelines as described in NEI 97-06, ensure the Steam Generator Tube Integrity Program is effective for maintaining the intended function of the steam generators including tubes, tube plugs or other tube repairs, and various secondary side tube supports.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Steam Generator Tube Integrity Program is an existing program. It is consistent, with exception, to the recommendations of NUREG-1801, Chapter XI, Program XI.M19, Steam Generator Tube Integrity.

Exceptions to NUREG-1801

Program Elements Affected

- Scope of Program

  The Steam Generator Tube Integrity Program incorporates the guidance of NEI 97-06, Revision 2, “Steam Generator Program Guidelines.” NUREG-1801 refers to Revision 1 of NEI 97-06. This is considered an exception to NUREG-1801. NEI 97-06 Revision 2 is consistent with Technical Specification Task Force Standard Technical Specification Change Traveler, TSTF-449, “Steam Generator Tube Integrity,” Revision 4, and incorporates additional changes developed by the industry as part of a continuing effort to improve steam generator program guidance. Therefore, the use of Revision 2 of NEI 97-06 is considered acceptable.

Enhancements

None

Operating Experience

A review of operating experience related to the Steam Generator Tube Integrity Program indicates the program has been effective in ensuring the timely detection and correction of steam generator aging effects such as loss of material, cracking, ligament cracking, and denting. The program utilizes operating experience to promote the identification and transfer of lessons learned from both internal and industry events so that the knowledge gained can be used to improve nuclear plant safety and operations.

The Steam Generator Tube Integrity Program has evolved to include improvements in programmatic features, such as non-destructive examination, primary-to-secondary leakage monitoring, and degradation-specific management. Recognizing the importance of steam generators to safe plant operations, NEI 97-06 provides a framework for a comprehensive Steam Generator Tube Integrity Program. PINGP has evaluated its existing Steam Generator Tube Integrity Program against NEI 97-06, and, where necessary, revised and strengthened the program attributes to meet the intent of the guidance. The industry, working through EPRI, has also strengthened their Steam Generator Tube Integrity Programs with aggressive improvements in control of secondary side water chemistry and upgrades in secondary side equipment, thus essentially eliminating both wastage and denting.

In accordance with NEI 97-06, the PINGP Steam Generator Tube Integrity Program conducts a condition monitoring assessment to assess the “As Found” condition of the steam generator tubing relative to structural integrity and leakage integrity criteria. The evaluation is performed to confirm that adequate tube integrity has been maintained since the previous inspection. This assessment is conducted during each outage during which the steam generator tubes are inspected, plugged, or repaired to confirm that the performance criteria are being met. Following each steam generator tube inspection, an operational assessment is conducted to confirm that adequate tube integrity will be maintained for the operating interval between inspections. A comparison of the latest condition monitoring results is made to the previous cycle's operational assessment prediction. If the comparison shows that the operational assessment did not bound the latest condition monitoring results, then corrective action is initiated to identify the cause and adjust the new operational assessment as necessary.

Conclusion

The Steam Generator Tube Integrity Program is an existing program that maintains the integrity of the steam generators by managing the effects of aging in steam generator tubes, tube plugs, tube repairs, and various steam generator secondary side internal components. The program manages aging effects through a balance of prevention, inspection, evaluation, repair, and leakage monitoring measures.

Implementation of the Steam Generator Tube Integrity Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B2.1.38 Structures Monitoring Program

Program Description

The Structures Monitoring Program is a condition monitoring program that manages aging effects in structures, supports and structural components, including bolting, within the scope of License Renewal. The Structures Monitoring Program is a sub-element of the Maintenance Rule Program, which implements current industry guidance (e.g., NUMARC 93-01, “Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants”) as endorsed by NRC Regulatory Guides 1.160 “Monitoring the Effectiveness of Maintenance at Nuclear Power Plants,” and 1.182, “Assessing and Managing Risk before Maintenance Activities at Nuclear Power Plants.” The program performs periodic visual inspections to monitor the condition of structures, supports and components, including bolting, against established acceptance criteria to ensure that degraded conditions are identified, evaluated, and, when necessary, corrected such that there is no loss of intended function.

The program incorporates inspection guidance based on recommendations contained in ACI 349.3R, “Evaluation of Existing Nuclear Safety-Related Concrete Structures.”

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Structures Monitoring Program is an existing program. It will be enhanced to be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.S6, Structures Monitoring Program.

Exceptions to NUREG-1801

None

Enhancements

The following enhancements are required to satisfy NUREG-1801 aging management program recommendations. Enhancements will be implemented prior to the period of extended operation.

- Scope of Program

  The program will be enhanced to add the following structures, components, and component supports to the scope of the inspections:

  a. Approach Canal

  b. Fuel Oil Transfer House

  c. Old Administration Building and Administration Building Addition

  d. Component supports for cable tray, conduit, cable, tubing tray, tubing, non-ASME vessels, exchangers, pumps, valves, piping, mirror insulation, non-ASME valves, cabinets, panels, racks, equipment enclosures, junction boxes, bus ducts, breakers, transformers, instruments, diesel equipment, housings for HVAC fans, louvers and dampers, HVAC ducts, vibration isolation elements for diesel equipment, and miscellaneous electrical and mechanical equipment items

  e. Miscellaneous electrical equipment and instrumentation enclosures including cable tray, conduit, wireway, tube tray, cabinets, panels, racks, equipment enclosures, junction boxes, breaker housings, transformer housings, lighting fixtures, and metal bus enclosure assemblies

  f. Miscellaneous mechanical equipment enclosures including housings for HVAC fans, louvers, and dampers

  g. SBO Yard Structures and components including SBO cable vault and bus duct enclosures.

  h. Fire Protection System hydrant houses

  i. Caulking, sealant and elastomer materials

  j. Non-safety related masonry walls that support equipment relied upon to perform a function that demonstrates compliance with a regulated event(s).

- Parameters Monitored/Inspected

  The program will be enhanced to include additional inspection parameters.

- Detection of Aging Effects

  The program will be enhanced to require an inspection frequency of once every five (5) years for the inspection of structures and structural components within the scope of the program. The frequency of inspections can be adjusted, if necessary, to allow for early detection and timely correction of negative trends.

  The program will be enhanced to require periodic sampling of groundwater and river water chemistries to ensure they remain non-aggressive.

Operating Experience

A review of operating experience indicates that the Structures Monitoring Program has been effective in maintaining plant structures and structural components. Aging effects, such as minor examples of leakage, corrosion, and concrete degradation, have been identified, evaluated, and managed effectively, ensuring that structures and components remain capable of performing their intended functions.

The review of operating experience indicates that the Structures Monitoring Program is effective in monitoring and detecting degradation and taking effective corrective actions as needed when acceptance criteria are not met.

Conclusion

The Structures Monitoring Program is an existing program that monitors the condition of structures, supports and structural components, including bolting, through periodic visual inspections.

Implementation of the enhanced Structures Monitoring Program provides reasonable assurance that aging effects will be managed effectively such that structures and components within the scope of this program will continue to perform their intended functions during the period of extended operation.

B2.1.39 Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program

Program Description

The Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program manages loss of fracture toughness due to thermal aging embrittlement of CASS components, other than pump casings and valve bodies, that are exposed to reactor coolant operating temperatures. The program determines the susceptibility of CASS components to loss of fracture toughness due to thermal aging embrittlement based on the casting method, molybdenum content, and percent ferrite. For components determined to be potentially susceptible to thermal aging embrittlement, the program provides for enhanced volumetric examinations or component-specific flaw tolerance evaluations. The program augments the PINGP ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program.

The CASS pump casings and valve bodies are excluded from screening for susceptibility to thermal aging based on the assessment documented in the letter dated May 19, 2000, from Christopher Grimes, Nuclear Regulatory Commission (NRC), to Douglas Walters, Nuclear Energy Institute (NEI), “Thermal Aging Embrittlement of Cast Austenitic Stainless Steel Components” (ADAMS Accession number ML003717179). The CASS pump casings and valve bodies are adequately addressed by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program requirements.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program is a new program. It will be consistent with the recommendations of NUREG-1801, Chapter XI, Program XI.M12, Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS).

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Thermal Aging Embrittlement of Cast Austenitic Stainless Steel Program is a new program to be implemented prior to the period of extended operation, and therefore, has no operating experience related to program implementation.

Conclusion

The Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program is a new program that augments the PINGP ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program. This program determines the susceptibility to thermal aging embrittlement of cast austenitic stainless steel components exposed to reactor coolant operating temperatures. For components determined to be potentially susceptible to thermal aging embrittlement, the program provides for enhanced volumetric examinations or component-specific flaw tolerance evaluations.

Implementation of the Thermal Aging Embrittlement of Cast Austenitic Stainless Steel Program will provide reasonable assurance that aging effects will be managed such that the CASS components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

This program will be implemented prior to the period of extended operation.

B2.1.40 Water Chemistry Program

Program Description

The Water Chemistry Program manages aging effects by controlling the internal environment of systems and components. The program mitigates corrosion, stress corrosion cracking (SCC) and heat transfer degradation due to fouling in the primary, auxiliary (borated), and secondary water systems included in the scope of the program. Aging effects are managed by controlling concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below the levels known to cause degradation. The program includes specifications for chemical species, sampling and analysis frequencies, and corrective actions for control of water chemistry. This program conforms to both the EPRI “PWR Primary Water Chemistry Guidelines” and the EPRI “PWR Secondary Water Chemistry Guidelines.”

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Water Chemistry Program is an existing program. It will be enhanced to be consistent, with exceptions, to the recommendations of NUREG-1801, Chapter XI, Program XI.M2, Water Chemistry.

Exceptions to NUREG-1801

Program Elements Affected

- Parameters Monitored/Inspected

  Feedwater samples are not monitored for total copper as PINGP is an all-ferrous plant with no copper sources.

- Acceptance Criteria

  Primary water (reactor coolant) dissolved oxygen Action Level limits are consistent with the PINGP Technical Requirements Manual, but above the corresponding recommended EPRI guideline limits. However, typical plant oxygen levels are well below EPRI Action Level limits, and hydrogen levels are maintained in the reactor coolant to mitigate oxidizing effects due to radiolysis or oxygen ingress.

Feedwater hydrazine levels during heatup, hot shutdown, and startup (Modes 2, 3, and 4) are maintained greater than 100 ppb, which is higher and more conservative than the 20 ppb required by the EPRI guidance to control the input of oxygen by feedwater.

Enhancements

The following enhancement is required to satisfy NUREG-1801 aging management program recommendations. The enhancement will be implemented prior to the period of extended operation.

- Monitoring and Trending

  The program will be enhanced to require increased sampling to be performed as needed to confirm the effectiveness of corrective actions taken to address an abnormal chemistry condition.

Operating Experience

A review of operating experience for the Water Chemistry Program identified no adverse trends or issues with program performance. Some instances have occurred where chemistry parameters did not meet limits. The plant has taken timely and effective corrective action in these cases to resolve the abnormal conditions. Many of these conditions were the result of equipment or plant transient conditions (e.g., plant startup), and were resolved once the transient condition subsided. The time durations of these conditions were typically short, and no evidence of detrimental equipment impacts could be found. No examples of component functional failures due to corrosion, cracking, or heat transfer degradation resulting from inadequate chemistry control were identified.

Industry experience related to cracking in the primary systems and cracking and corrosion in the secondary systems have been addressed by component replacements with less susceptible materials, continued reviews of industry experience, and adoption of the latest EPRI water chemistry guidelines. When cracking was identified in the primary systems (e.g., safety injection accumulator stainless steel cladding cracks) actions were taken to expand the inspection areas, perform metallurgical evaluations, repair as needed, and continue to follow the latest available primary water chemistry control guidelines.

With the exception of the Unit 1 chemistry performance index, no adverse trends in water chemistry were identified by review of recent sampling results. The Unit 1 chemistry performance index had been demonstrating an adverse trend due to higher than desired sulfate levels. This issue was documented in the site Corrective Action Program, a troubleshooting plan was prepared and implemented, and the source of the sulfate was identified (main condenser tube leakage). Actions were taken to identify and correct the specific location of the leakage through a scheduled plant down power to access the main condenser tubes for testing and repair. The chemistry performance index was restored to an acceptable value.

The Water Chemistry Program effectively monitors the condition of the pressure retaining components included in the scope of the program and ensures aging effects are acceptably managed. The review of operating experience indicates the Water Chemistry Program is effective in monitoring and detecting degradation and taking effective corrective actions as needed when acceptance criteria are not met.

Conclusion

The Water Chemistry Program is an existing program that manages aging effects by controlling concentrations of known detrimental chemical species such as chlorides, fluorides, sulfates and dissolved oxygen below levels known to cause degradation. The program has been effective in controlling plant chemistry and taking required actions to address out-of-specification values.

Implementation of the enhanced Water Chemistry Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

B3.0 Time-Limited Aging Analyses Aging Management Programs

B3.1 Environmental Qualification (EQ) of Electrical Components Program

Program Description

The Environmental Qualification (EQ) of Electrical Components Program (EQ Program) implements the requirements of 10 CFR 50.49, (as further defined and clarified by the DOR Guidelines and NUREG-0588), and the guidance provided in Regulatory Guide 1.89, “Environmental Qualification of Certain Electrical Equipment Important to Safety for Nuclear Plants,” Revision 1. The EQ Program has been established to demonstrate that certain electrical components located in harsh plant environments are qualified to perform their safety functions in those harsh environments, consistent with 10 CFR 50.49 requirements. The EQ Program manages component thermal, radiation, and cyclical aging through the use of aging evaluations based on 10 CFR 50.49(f) qualification methods. As required by 10 CFR 50.49, EQ components not qualified for the current license term are to be refurbished or replaced, or have their qualification extended by reanalysis, prior to reaching the aging limits established in the evaluation.

Aging evaluations for EQ components that specify a qualification of at least 40 years are considered TLAAs. The EQ Program will manage the aging effects of the components addressed by the EQ TLAAs through the period of extended operation.

The reanalysis of an aging evaluation for the qualification of components under 10 CFR 50.49(e) is performed on an as-needed basis as part of the EQ Program. Reanalysis may be performed to extend the qualification through the refinement of previous methods or conservative environmental condition assumptions. Important attributes of the reanalysis of an aging evaluation include analytical methods, data collection and reduction methods, underlying assumptions, acceptance criteria, and corrective actions (if acceptance criteria are not met).

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Environmental Qualification (EQ) of Electrical Components Program is an existing program. It is consistent with the recommendations of NUREG-1801, Chapter X, Program X.E1, Environmental Qualification (EQ) of Electrical Components.

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

A review of operating experience for the PINGP EQ Program identified no adverse trends or issues with program performance. Minor issues, such as improper splice configurations in the field differing from the tested configuration and normal temperature reference improvements, have been identified and corrected prior to causing any significant impact to safe operation or loss of intended functions.

Conclusion

The Environmental Qualification of Electrical Components Program is an existing program that implements the requirements of 10 CFR 50.49 to maintain the environmental qualification requirements for all EQ electrical equipment within the scope of the program.

Implementation of the Environmental Qualification of Electrical Components Program provides reasonable assurance that aging effects will be managed such that the electrical equipment within the scope of this program will continue to perform their intended functions during the period of extended operation.

B3.2 Metal Fatigue of Reactor Coolant Pressure Boundary Program

Program Description

The Metal Fatigue of Reactor Coolant Pressure Boundary Program monitors the thermal and pressure transients experienced by selected reactor coolant system pressure boundary components to ensure those components remain within their design fatigue usage limits. The program uses the systematic counting of plant transient cycles to ensure that design assumptions for cumulative transient cycles are not exceeded. The program also uses computerized cycle-based or stress-based monitoring methods to track fatigue usage in critical high-usage components. Locations monitored by the program include the six component locations for older vintage Westinghouse plants identified in NUREG/CR-6260 as representative locations for the effect of reactor coolant environment on component fatigue life.

The program ensures that cumulative fatigue usage of each affected primary system location is evaluated, and corrective actions taken if necessary, when the number or magnitude of accumulated thermal and pressure transients approach or exceed design cycle assumptions, or when the projected fatigue usage approaches a value of 1.0, during the life of the plant including the period of extended operation.

NUREG-1801 Consistency

The Prairie Island Nuclear Generating Plant Metal Fatigue of Reactor Coolant Pressure Boundary Program is an existing program. It will be enhanced to be consistent with the recommendations of NUREG-1801, Chapter X, Program X.M1, Metal Fatigue of Reactor Coolant Pressure Boundary.

Exceptions to NUREG-1801

None

Enhancements

The following enhancements are required to satisfy NUREG-1801 aging management program recommendations. Enhancements will be implemented prior to the period of extended operation.

- Scope of Program, Preventive Actions, Parameters Monitored/Inspected, Detection of Aging Effects, Monitoring and Trending

  The program will monitor the six component locations identified in NUREG/CR-6260 for older vintage Westinghouse plants, either by tracking the cumulative number of imposed stress cycles using cycle counting, or by tracking the cumulative fatigue usage, including the effects of coolant environment, using cycle-based or stress-based fatigue usage monitoring. The following locations will be monitored:

  NUREG/CR-6260 Location (Monitoring Type)

  Reactor Pressure Vessel Inlet and Outlet Nozzles (Cycle Counting)

  Reactor Pressure Vessel Shell to Lower Head (Cycle Counting)

  RCS Hot Leg Surge Line Nozzle (Stress-Based Fatigue Usage Monitoring)

  RCS Cold Leg Charging Nozzle (Stress-Based Fatigue Usage Monitoring)

  RCS Cold Leg Safety Injection Accumulator Nozzle (Cycle-Based Fatigue Usage Monitoring)

  RHR-to-Accumulator Piping Tee (Cycle-Based Fatigue Usage Monitoring)

  The program will implement stress-based fatigue usage monitoring for selected locations subject to pressurizer insurge/outsurge transients. The following locations will be monitored:

  Component Location

  RCS Hot Leg Surge Line Nozzle (also a NUREG/CR-6260 Location)

  Pressurizer Lower Head (Heater Penetrations)

  Pressurizer Surge Nozzle

  Pressurizer Surge Line Elbow

- Acceptance Criteria

  Program acceptance criteria will be clarified to require corrective action to be taken before a cumulative fatigue usage factor exceeds 1.0 or a design basis transient cycle limit is exceeded.

  Reactor internals baffle bolt fatigue transient limits of 1835 cycles of plant loading at 5% per minute and 1835 cycles of plant unloading at 5% per minute will be incorporated into the Metal Fatigue of Reactor Coolant Pressure Boundary Program and USAR Table 4.1-8 to conform to the baffle bolt fatigue limits discussed in LRA Section 4.3.1.2, Reactor Vessel Internals.

Operating Experience

A review of operating experience associated with the Metal Fatigue of Reactor Coolant Pressure Boundary Program has demonstrated that the program effectively monitors plant transients and tracks the accumulation of these transients. Industry experience has been factored into the program as appropriate, including evaluation of thermal/operating stresses that were not considered in the original design. Evaluation has been performed for NRC Bulletin 88-11, “Pressurizer Surge Line Thermal Stratification,” and is in progress for EPRI MRP-146, “Management of Thermal Fatigue in Normally Stagnant Non-Isolable RCS Branch Lines.”

In addition, plant-specific fatigue analyses that include environmental effects were performed for the six component locations in older vintage Westinghouse plants evaluated in NUREG/CR-6260, Section 5.5. The corresponding locations at PINGP are the reactor vessel inlet and outlet nozzles, reactor vessel shell and lower head, reactor coolant system hot leg surge line nozzle, reactor coolant piping charging nozzle, reactor coolant piping safety injection nozzle, and residual heat removal Class 1 piping tee (12-inch by 10-inch reducing tee). Three of these component locations were designed in accordance with B31.1.0 (charging nozzle, safety injection nozzle, and residual heat removal Class 1 piping tee) and did not have original design fatigue analyses. It was concluded that fatigue usage monitoring should be expanded to include the NUREG/CR-6260 locations not previously monitored by the cycle counting program.

Conclusion

The Metal Fatigue of Reactor Coolant Pressure Boundary Program is an existing program that has been demonstrated to maintain the validity of the fatigue design basis for reactor coolant system components designed to withstand the effects of cyclic loads due to reactor system temperature and pressure changes. The program has been effective in monitoring plant transients and corrective actions have been taken when design cycles have been approached and when design limits have been exceeded.

Implementation of the Metal Fatigue of Reactor Coolant Pressure Boundary Program provides reasonable assurance that aging effects will be managed such that structures, systems, and components within the scope of this program will continue to perform their intended function(s) during the period of extended operation.

APPENDIX C

(Not Used for This Application)

APPENDIX C
Contents

C1.0 APPENDIX C - NOT USED

Appendix C is not used in this application.

APPENDIX D

TECHNICAL SPECIFICATIONS CHANGES

APPENDIX D
Contents

D1.0 APPENDIX D - TECHNICAL SPECIFICATIONS CHANGES

10 CFR 54.22 requires that an application for License Renewal include any Technical Specifications changes or additions that are necessary to manage the effects of aging during the period of extended operation. A review of the information provided in this License Renewal Application and the PINGP Technical Specifications confirms that no changes to the Technical Specifications are necessary.

APPENDIX E

ENVIRONMENTAL REPORT

(Provided as Linked Document)

APPENDIX E
Contents

E1.0 APPENDIX E - ENVIRONMENTAL REPORT

This page provides a link to the Environmental Report.