APPLICATION FOR RENEWED OPERATING LICENSES

NINE MILE POINT NUCLEAR STATION UNITS 1 & 2

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1.0 ADMINISTRATIVE INFORMATION

1.1 PURPOSE AND GENERAL INFORMATION

Pursuant to Part 54 of Title 10 of the Code of Federal Regulations (10 CFR 54), this application seeks renewal for an additional 20 year term of the facility operating license for Nine Mile Point (NMP) Nuclear Station Unit 1 (DPR-63) and Unit 2 (NPF-69). The NMP Unit 1 (NMP1) operating license currently expires at midnight, August 22, 2009. The NMP Unit 2 (NMP2) operating license currently expires at midnight, October 31, 2026. Since Nine Mile Point Nuclear Station, LLC (NMPNS) is submitting this application prior to 20 years before the expiration of the operating license for NMP2, NMPNS submitted to the U.S. Nuclear Regulatory Commission (NRC) a request for exemption[1] from the schedular requirements of 10 CFR 54.17(c), along with a supplemental letter[2]. The NRC approved this request on October 8, 2002[3].

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

1.1.1 NAME OF APPLICANT

Nine Mile Point Nuclear Station, LLC

1.1.2 ADDRESS OF APPLICANT

Nine Mile Point Nuclear Station, LLC
1997 Annapolis Exchange Parkway
Annapolis, MD 21401

Address of Nine Mile Point Nuclear Station

Nine Mile Point Nuclear Station
P.O. Box 63
Lycoming, NY 13093

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[1] Letter from NMPNS to the NRC, letter number NMP2L 2042, dated January 4, 2002, *Request for Exemption from the Requirements of 10 CFR §54.17(c), TAC No. MB3532.*

[2] Letter from NMPNS to the NRC, letter number NMP2L 2063, dated June 27, 2002, *Request for Exemption from the Requirements of 10 CFR §54.17(c), TAC No. MB3532, Response to Request for Additional Information.*

[3] Letter from the NRC to NMPNS, P.S. Tam to J.T. Conway, dated October 8, 2002, *Nine Mile Point Nuclear Station, Unit No. 2 – Schedular Exemption from the Requirements of 10 CFR Part 54, Section 54.17(c) (TAC No. MB3532).*

1.1.3 DESCRIPTION OF BUSINESS OR OCCUPATION OF APPLICANT

NMPNS is an indirect subsidiary of Constellation Generation Group, LLC (CGG), which is a member of the Constellation Energy Group (CEG).

On November 7, 2001, CEG completed its purchase of the NMPNS. CEG owns 100 percent of NMP1 and 82 percent of NMP2. The Long Island Power Authority owns the remaining 18 percent of NMP2. NMPNS is the exclusive operator and the holder of record for the operating licenses for both units.

NMPNS is engaged in the generation and sale of electric energy to wholesale customers. All revenue for operating expenses and routine improvements and additions is acquired through the sale of electricity and related services.

1.1.4 ORGANIZATION AND MANAGEMENT OF APPLICANT

NMPNS is a limited liability company organized under the laws of the State of Delaware with its principal office located in Annapolis, MD at the address stated in Section 1.1.2. Neither NMPNS, nor its parent entities, are owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government. NMPNS makes this application on its own behalf.

The names and business addresses of NMPNS's directors and principal officers are listed below. All persons listed are U.S. citizens.

Directors	**Addresses**
Michael J. Wallace	Nine Mile Point Nuclear Station, LLC 1997 Annapolis Exchange Parkway Annapolis, MD 21401
James A. Spina	Nine Mile Point Nuclear Station, LLC P.O. Box 63 Lycoming, NY 13093

Principal Officers	**Addresses**
Michael J. Wallace Chairman of the Board and President	Nine Mile Point Nuclear Station, LLC 1997 Annapolis Exchange Parkway Annapolis, MD 21401

Principal Officers	**Addresses**
James A. Spina Vice President	Nine Mile Point Nuclear Station, LLC P.O. Box 63 Lycoming, NY 13093
Steven L. Miller, Esq. Secretary	Constellation Energy Group, Inc. 750 E. Pratt Street, 5th Floor Baltimore, MD 21202
Stephen A. Mormann Treasurer	Nine Mile Point Nuclear Station, LLC 1997 Annapolis Exchange Parkway Annapolis, MD 21401
James M. Petro, Jr., Esq. Assistant Secretary	Constellation Energy Group, Inc. 750 E. Pratt Street, 5th Floor Baltimore, MD 21202

1.1.5 CLASS AND PERIOD OF LICENSE SOUGHT

NMPNS requests renewal of the Class 104b operating license for NMP1 and the Class 103 operating license for NMP2 (license numbers DPR-63 and NPF-69, respectively) for an additional 20 year term of the facility operating license period. License renewal would extend the NMP1 facility operating license from midnight August 22, 2009 to midnight August 22, 2029 and would extend the NMP2 facility operating license from midnight October 31, 2026 to midnight October 31, 2046[4]. This application includes a request for renewal of those NRC source material, special nuclear material, and byproduct material licenses that are currently subsumed into or combined with the current operating licenses. The facility will continue to be known as the NMPNS and will continue to generate electric power during the renewal period.

1.1.6 ALTERATION SCHEDULE

NMPNS does not propose to construct or alter any production or utilization facility in connection with this renewal application.

[4] NMPNS realizes that this date may need to be adjusted, based on the provision in 10 CFR §54.31(b) that *The term of any renewed license may not exceed 40 years*.

1.1.7 REGULATORY AGENCIES HAVING JURISDICTION AND APPROPRIATE NEWS PUBLICATIONS

The Federal Energy Regulatory Commission has jurisdiction over the wholesale sales of energy and capacity by NMPNS. The New York State Public Service Commission also has jurisdiction over NMPNS.

The addresses of the agencies cited are:

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

New York State Public Service Commission
Empire State Plaza
Agency Building 3
Albany, NY 12223-1350

The area news publications that circulate in the area around NMPNS and that are considered appropriate to give reasonable notice of the application are:

Palladium Times
140 West First Street
Oswego, NY 13126

The Post Standard
Clinton Square
P.O. Box 4915
Syracuse, NY 13221-4915

1.1.8 CONFORMING CHANGES TO THE STANDARD INDEMNITY AGREEMENT

The requirements at 10 CFR 54.19(b) state that license renewal applications include, "…conforming changes to the standard indemnity agreement, 10 CFR 140.92, Appendix B, to account for the expiration term of the proposed renewed license." The current indemnity agreement for NMPNS does not contain a specific expiration term for the operating licenses. Therefore, conforming changes to account for the expiration term of the proposed renewed licenses are not necessary, unless the license number is changed upon issuance of the renewed licenses.

1.1.9 RESTRICTED DATA AGREEMENT

With regard to the requirements of 10 CFR 54.17(f), this application does not contain any "Restricted Data," as that term is defined in the Atomic Energy Act of 1954, as amended, or other defense information, and it is not expected that any such information will become involved in these licensed activities.

In accordance with the requirements of 10 CFR 54.17(g), NMPNS 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.

1.2 GENERAL LICENSE INFORMATION

1.2.1 APPLICATION UPDATES, RENEWED LICENSES, AND RENEWAL TERM OPERATION

In accordance with 10 CFR 54.21(b), during NRC review of this application, an annual update to the application to reflect any change to the current licensing basis that materially affects the contents of the license renewal application will be provided.

1.2.2 INCORPORATION BY REFERENCE

There are no documents incorporated by reference as part of the application. Any document references are listed for information only.

1.2.3 CONTACT INFORMATION

Any notices, questions, or correspondence in connection with this filing should be directed to:

James A. Spina Vice President	Nine Mile Point Nuclear Station, LLC P.O. Box 63 Lycoming, NY 13093
James M. Petro, Jr., Esq. Assistant Secretary	Constellation Energy Group, Inc. 750 E. Pratt Street, 5th Floor Baltimore, MD 21202

1.3 DESCRIPTION OF NINE MILE POINT NUCLEAR STATION

The NMPNS consists of two nuclear plants, on approximately 900 acres along the shore of Lake Ontario, Oswego County, NY, approximately 5 miles north-northeast of the nearest boundary of the city of Oswego. Both Nine Mile Point reactors are General Electric designed Boiling Water Reactors (BWRs). The licensed thermal capacity for NMP1 is 1850 MWt and for NMP2 it is 3467 MWt. The steam and power conversion system, including its turbine generator, is designed to permit generation of a net electrical output of approximately 615 MWe for NMP1 and 1144 MWe for NMP2. Descriptions of the NMPNS systems and structures can be found in the USAR[5]. Additional descriptive information about the NMPNS systems, structures, and components is also provided in Section 2 of this Application, and references to the USAR are provided where pertinent.

1.4 APPLICATION STRUCTURE

The following discussion describes the content of the NMPNS License Renewal Application (LRA). As an aid to the reviewer, electronic versions of the application contain marked hypertext, which provide links to the referenced sections.

The application is divided into the following major sections and appendices:

Section 1 – Administrative Information

Section 1 provides the administrative information required by Part 54 of Title 10 of the Code of Federal Regulations, Sections 17 and 19 (10 CFR 54.17 and 10 CFR 54.19).

Section 2 – Structures and Components Subject To Aging Management Review

This section describes and justifies the methods used in the integrated plant assessment to identify those structures and components subject to an aging management review in accordance with the requirements of 10 CFR 54.21(a)(2).

These methods consist of: 1) scoping, which identifies the systems and structures that are within the scope of 10 CFR 54.4(a), and 2) screening

[5] USAR refers to both the NMP1 Updated Final Safety Analysis Report and the NMP2 Updated Safety Analysis Report.

under 10 CFR 54.21(a)(1), which identifies those in-scope structures and components that perform their intended function without moving parts or a change in configuration or properties, and that are not subject to replacement based on a qualified life or specified time period.

Additionally, the scoping results for systems and structures are presented in Table 2.2-1, NMP1 Plant Level Scoping Results, and Table 2.2-2, NMP2 Plant Level Scoping Results.

The screening results consist of lists of structures and components or component groups that require aging management review. Brief descriptions of systems and structures within the scope of license renewal are provided as background information. Additionally, references to the USAR and the License Renewal (LR) drawings, as applicable, are provided. The drawings, which are provided as a separate attachment to the LRA, are neither incorporated by reference into the application nor considered to be part of the LRA. System and structure intended functions are provided for in-scope systems and structures. For each in-scope system and structure, components or component groups requiring an aging management review are identified.

To aid the reviewer, NMP1 systems and structures are designated by the letter “A” in the section numbering and the letter “B” in the section numbering designates NMP2 systems and structures. For example, the NMP1 Control Rod Drive System has section number 2.3.1.A.1, whereas the NMP2 Control Rod Drive System has section number 2.3.1.B.1.

Selected structural and electrical component groups, such as component supports and cables, were evaluated as commodities. Under the commodity approach, selected structural and electrical component groups were evaluated based upon common environments and materials. For each of these commodities, the components or component groups requiring aging management are presented in Sections 2.4 and 2.5. The letter “C” is used to designate commodities that apply to both units. For example, the component supports commodity has section number 2.4.C.1.

Section 3 – Aging Management Review Results

10 CFR 54.21(a)(3) requires a demonstration that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the current licensing basis throughout the period of extended operation. Section 3 presents the results of the aging management reviews. Section 3 is the link between the scoping and screening results provided in Section 2 and the aging management activities provided in Appendix B. Aging management review results are presented in tabular form, and

arranged by the system or structure associated with one or more intended functions. These tables identify the aging effects and the activities credited with managing the aging effects for component groups within the scope of license renewal. Further information on these tables is provided in Section 3.0.

Selected structural and electrical component groups, such as component supports and cables, were evaluated as commodities based upon common environments and materials. Aging management review results for these commodities are presented in Section 3.5 and Section 3.6.

Section 4 – Time-Limited Aging Analyses

TLAAs, as defined by 10 CFR 54.3, are listed in Section 4. This section includes each of the TLAAs identified in the NRC Standard Review Plan for License Renewal Applications and in plant-specific analyses. This section includes a summary of the time-dependent aspects of the analyses. A demonstration is provided to show that the analyses remain valid for the period of extended operation, the analyses have been, or will be, 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 Final Safety Analysis Report Supplement

As required by 10 CFR 54.21(d), the USAR supplement contains a summary of activities credited for managing the effects of aging for the period of extended operation. In addition, summary descriptions of TLAA evaluations are provided. A separate USAR supplement is provided for NMP1 and NMP2.

Appendix B – Aging Management Programs

This appendix contains the activities that are credited for managing aging effects for structures and components during the period of extended operation based upon the aging management review results provided in Section 3 and the TLAA results provided in Section 4.

Appendix C – Commodity Groups (Optional)

Appendix C is not used.

Appendix D – Technical Specification Changes

This appendix satisfies the requirements of 10 CFR 54.22 to identify whether any technical specification changes or additions are necessary to manage the effects of aging during the period of extended operation.

Appendix E – Environmental Information

This appendix satisfies the requirements of 10 CFR 54.23 to provide a supplement to the environmental report that complies with the requirements of subpart A of 10 CFR Part 51.

1.5 ACRONYMS

The following is a list of the Acronyms used in this application, except for those listed in Table 2.0-1, Intended Functions Abbreviations & Definitions.

ACRONYM	MEANING
115KVAC	115KV AC Electrical Distribution
120VAC	120V AC Electrical Distribution
125VDC	125V DC Electrical Distribution
13.8KVAC	13.8KV AC Electrical Distribution
24VDC	24V DC Electrical Distribution
4.16KVAC	4.16KV AC Electrical Distribution
600VAC	600V AC Electrical Distribution
AC	Alternating Current
ALARA	As Low as Reasonably Achievable
AMP	Aging Management Program
AMR	Aging Management Review
ANSI	American National Standards Institute
ARI	Alternate Rod Insertion
ART	Adjusted Reference Temperature
ASB	Auxiliary Service Building
ASME	American Society Of Mechanical Engineers
ASTM	American Society for Testing Materials
ATWS	Anticipated Transients Without Scram
B24V	Battery-24V-Station
BSW	Biological Shield Wall
BWR	Boiling Water Reactor
BWRVIP	Boiling Water Reactor Vessel and Internals Project
CASS	Cast Austenitic Stainless Steel
CBF	Cycle Based Fatigue
CCCWS	Closed-Cycle Cooling Water System
CEG	Constellation Energy Group
CFR	Code of Federal Regulations
CGG	Constellation Generation Group
CLB	Current Licensing Basis
CRB	Control Room Building
CRD	Control Rod Drive
CRDRL	Control Rod Drive Return Line
CST	Condensate Storage Tank
CUF	Cumulative Usage Factor
DBA	Design Basis Accident
DBD	Design Basis Document
DBTT	Ductile-to-brittle transition temperature
DC	Direct Current
DER	Deviation Event Report
DGB	Diesel Generator Building
ECS	Emergency Cooling System
ECCS	Emergency Core Cooling Systems
ECT	Eddy Current Testing
EDG	Emergency Diesel Generator

ACRONYM	MEANING
EFPY	Effective Full Power Years
EPRI	Electric Power Research Institute
EQ	Environmental Qualification
ERV	Electromatic Relief Valve
ESF	Engineered Safety Features
EYS	Essential Yard Structures
FAC	Flow-Accelerated Corrosion
FMP	Fatigue Monitoring Program
FPEE	Fire Protection Engineering Evaluation
FW	Feedwater
FW/HPCI	Feedwater/ High Pressure Coolant Injection
FWS	Feedwater System
GALL	NUREG-1801, *Generic Aging Lessons Learned*
GE	General Electric
GL	Generic Letter
GSI	Generic Safety Issue
GWT	Ground Water Table
HCU	Hydraulic Control Unit
HELB	High Energy Line Break
HEPA	High Efficiency Particulate Air
HPCI	High Pressure Coolant Injection
HPCS	High Pressure Core Spray
HVAC	Heating, Ventilation, and Air Conditioning
I & C	Instrumentation and Controls
IBA	Intermediate-Break Accident
IGSCC	Intergranular Stress Corrosion Cracking
INPO	Institute of Nuclear Power Operations
IPA	Integrated Plant Assessment
ISG	Interim Staff Guidance
ISI	Inservice Inspection
ISP	Integrated Surveillance Program
KV	Kilovolt
KVA	Kilovot Amperes
LOCA	Loss of Coolant Accident
LOOP	Loss of Offsite Power
LPCI	Low Pressure Coolant Injection
LPCS	Low Pressure Core Spray
LR	License Renewal
LRA	License Renewal Application
LRT	Leak Rate Test
MCC	Motor Control Center
MEL	Master Equipment List
MG	Motor Generator
MS	Main Steam
MSIV	Main Steam Isolation Valve
NDE	Non-Destructive Examinations
NEI	Nuclear Energy Institute
NEIL	Nuclear Electric Insurance Limited
NFPA	National Fire Protection Association
NMP1	Nine Mile Point Unit 1
NMP2	Nine Mile Point Unit 2

ACRONYM	MEANING
NMPC	Niagara Mohawk Power Corporation
NMPNS	Nine Mile Point Nuclear Station
NRC	Nuclear Regulatory Commission
NSR	Non-Safety Related
NUMARC	Nuclear Management and Resources Council (now NEI)
NWSLR	Not Within the Scope of License Renewal
OCCWS	Open-Cycle Cooling Water System
OGB	Offgas Building
ORNL	Oak Ridge National Laboratory
P&ID	Piping and Instrumentation Diagram
PCS	Primary Containment Structure
PM	Preventive Maintenance
PMT	Post-Maintenance Test
P-T	Pressure-Temperature
PTS	Pressurized Thermal Shock
PUAR	Plant-Unique Analysis Report
RB	Reactor Building
RCIC	Reactor Core Isolation Cooling
RCPB	Reactor Coolant Pressure Boundary
RCS	Reactor Coolant System
RG	Regulatory Guide
RHR	Residual Heat Removal
RPS	Reactor Protection System
RPT	Reactor Recirculation Pump Trip
RPV	Reactor Pressure Vessel
RSSB	Radwaste Solidification and Storage Building
RT_{NDT}	Reference Temperature Nil Ductility Transition Temperature
RWB	Radwaste Building
RWCU	Reactor Water Cleanup
SBA	Small-Break Accident
SBF	Stress Based Fatigue
SBO	Station Blackout
SCs	Structures and Components
SCC	Stress Corrosion Cracking
SDC	Shutdown Cooling
SER	Safety Evaluation Report
SGTB	Standby Gas Treatment Building
SGTS	Standby Gas Treatment System
SOC	Statements of Consideration
SPH	Screen and Pumphouse
SR	Safety Related
SRV	Safety Relief Valve
SSCs	Systems, Structures, and Components
SWB	Screenwell Building
TB	Turbine Building
TBCLC	Turbine Building Closed Loup Cooling
TER	Technical Evaluation Report
TLAAs	Time-Limited Aging Analyses
UFSAR	Updated Final Safety Analysis Report
UPS	Uninterruptible Power Supplies
USAR	Updated Safety Analysis Report

ACRONYM	MEANING
USAS	United States of America Standards
USE	Upper-Shelf Energy
UT	Ultrasonic Testing
UV	Ultraviolet
V	Volt
WDB	Waste Disposal Building
WO	Work Order
WSLR	Within the Scope of License Renewal

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

This section provides the scoping and screening results for those component types that will be subject to aging management review in Section 3.0.

Definitions and abbreviations of the component intended functions, which were used in the scoping, screening, and aging management reviews, are included in Table 2.0-1.

Table 2.0-1: Intended Functions Abbreviations & Definitions

Intended Function	Abbreviation	Definition
Absorbs Neutrons	AN	Provides neutron absorption for reactivity control
Cooling Water Source	CWS	Provide source of cooling water for plant shutdown (retention ponds or other structures that retain water)
Direct Flow	DF	Provide spray shield or curbs for directing flow
Electrical Continuity	EC	Provide continuity to deliver electrical signals or power (includes required insulation to accomplish)
Electrical Insulation	EI	Provide electrical insulation between components and structures (applies only to electrical insulators)
Filtration	FLT	Provide filtration
Fire Barrier	FB	Provide rated fire barrier to confine or retard a fire from spreading to or from adjacent areas of the plant
Fission Product Barrier	FPB	Provide fission product retention barrier to protect public health and safety
Flood Protection	FP	Provide flood protection barrier (internal and external flood)
Flow Control	FC	Control flow, distribute flow, eliminate flow inequalities, or prevent vortices

Table 2.0-1: Intended Functions Abbreviations & Definitions

Intended Function	Abbreviation	Definition
Flow Restriction	FR	Provide restriction to throttle or measure flow (to mitigate design basis or regulated events)
Gaseous Discharge Path	GDP	Provide path for release of filtered and unfiltered gaseous discharge (vent stacks)
Heat Sink	HS	Provide heat sink (structures that absorb heat)
Heat Transfer	HT	Provide heat transfer
HELB Shielding	HELB	Provide shielding against high energy line breaks
Missile Barrier	MB	Provide missile barrier (internally or externally generated)
NSR Functional Support	NFS	Provide Non-Safety Related (NSR) functional support to satisfy License Renewal (LR) criterion 2 or 3 (applies only to NSR equipment, including pressure boundaries)
Pipe Whip Restraint	PWR	Provide pipe whip restraint
Pressure Boundary	PB	Provide pressure-retaining boundary (applies only to SR equipment)
Prevent Failure from Affecting SR Equipment	PFASRE	Maintain structural integrity of NSR piping, fittings, and equipment. Applies to NSR equipment within the scope of license renewal (WSLR) to satisfy ISG-09 (see Section 2.1.6.9) only
Radiation Shielding	RD	Provide shielding against radiation
Shelter/Protection	SP	Provide shelter/protection to safety-related components
Structural Support for NSR	SNSR	Provide structural support to NSR components used to satisfy LR criterion 2 or 3
Structural/Functional Support	SFS	Provide structural and / or functional support to safety-related equipment
Thermal Shielding	TS	Provide thermal shielding

2.1 SCOPING AND SCREENING METHODOLOGY

2.1.1 INTRODUCTION

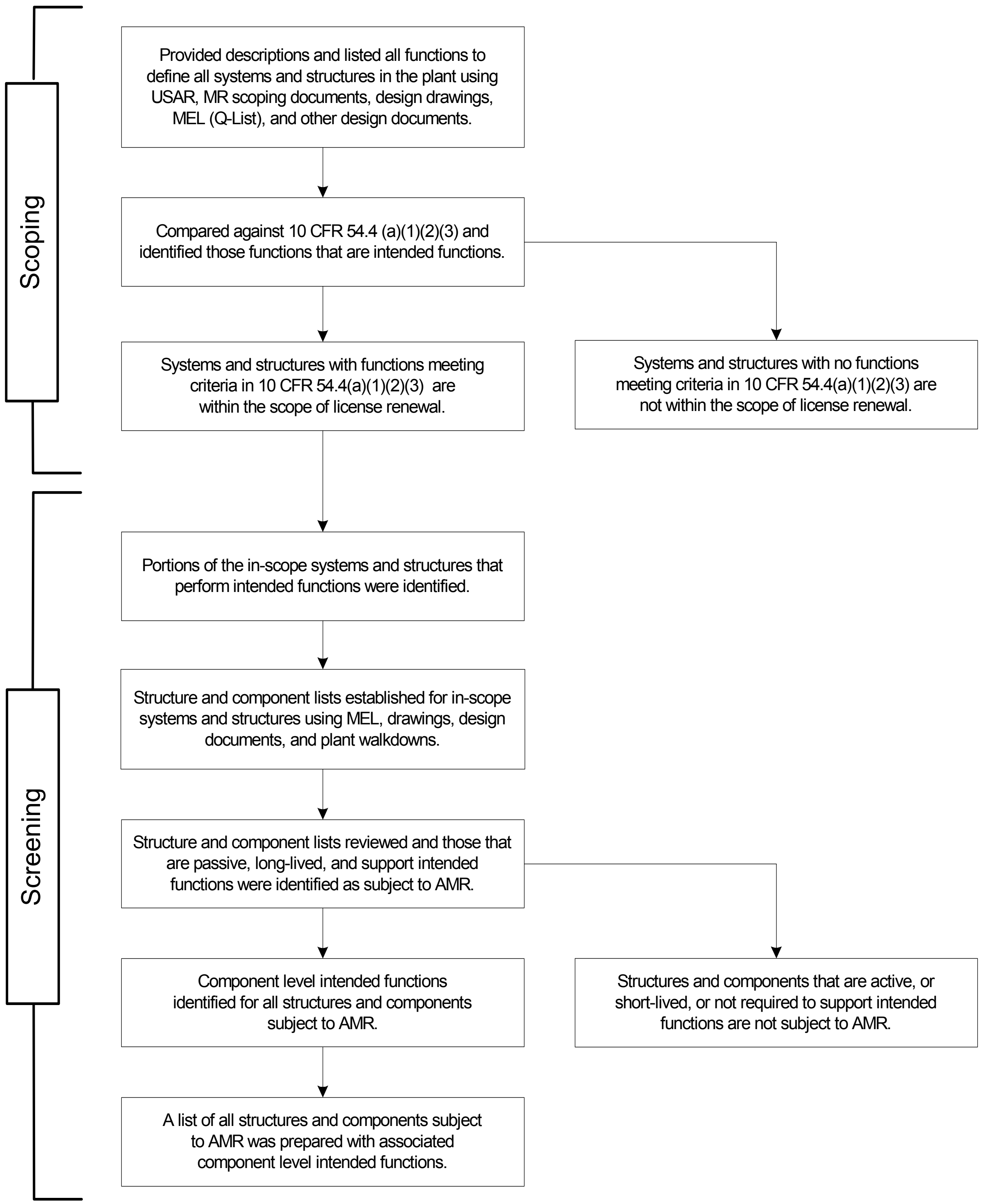
This introduction provides an overview of the scoping and screening process used at the Nine Mile Point Nuclear Station (NMPNS). Subsequent sections provide the details of how these steps were performed. For those systems, structures and components (SSCs) within the scope of license renewal (WSLR), 10 CFR 54.21(a)(1) requires the license renewal applicant, in its integrated plant assessment, to identify and list the structures and components (SCs) subject to an Aging Management Review (AMR). 10 CFR 54.21(a)(2) further requires that the methods used to identify and list the SCs be described and justified. Section 2 of this application satisfies these requirements.

The initial step in scoping was to define NMP1 and NMP2 in terms of their systems and structures. Each of these systems and structures were evaluated against the scoping criteria in 10 CFR 54.4 (a)(1), (2), and (3), to determine if they perform intended functions. This step was accomplished using the Updated Safety Analysis Report (USAR)[1], Maintenance Rule scoping documents, Technical Specifications, docketed correspondence, Design Basis Documents (DBDs), controlled drawings, and the Master Equipment List (MEL), which serves as the component level Q-list at NMPNS. During the initial scoping process, a description and all functions were defined for all systems and structures in the plant. Subsequently, those functions that are intended functions were identified, and portions of the systems and structures that perform those intended functions were identified. Systems and structures meeting the scoping criteria of 10 CFR 54.4 were thus established. Not all of the SCs that make up in-scope systems and structures are WSLR since some do not support intended functions. This determination was made during the component screening process that was used to identify all passive, long-lived SCs that perform intended functions as subject to AMR. In addition, component level intended functions (e.g., pressure boundary, restrict flow) were identified for such SCs prior to AMR.

The NMPNS scoping and screening methodology is described in greater detail in Sections 2.1.2 through 2.1.5. Scoping results are provided in Section 2.2. Screening results are provided in Sections 2.3, 2.4, and 2.5. Figure 2.1.1-1 provides a basic diagram depicting how the scoping and screening process was performed.

[1] USAR refers to both the NMP1 Updated Final Safety Analysis Report and the NMP2 Updated Safety Analysis Report.

Figure 2.1.1-1 Scoping and Screening Process Overview



2.1.2 PLANT LEVEL SCOPING

10 CFR 54 provides specific criteria for determining which SSCs should be WSLR. Specifically, §54.4 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 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 off-site exposures comparable to those referred to in §50.34(a)(1), §50.67(b)(2), or §100.11 of this chapter, as applicable.

(2) All 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 §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.

NMPNS systems and structures were reviewed and evaluated against the criteria outlined above to determine those that met the requirements for inclusion in the scope of license renewal.

2.1.3 SYSTEM BOUNDARY AND COMMODITY GROUPINGS

In cases where systems or structures perform similar functions, it was more feasible or efficient to address a smaller system or structure as part of a larger system or structure. In these cases, all components of the smaller system or structure were evaluated with the larger system or structure and all functions of the smaller system or structure were addressed in the larger system or structure. The Plant Level Scoping Results (Section 2.2) indicate when smaller systems or structures are addressed as part of larger systems or structures.

In other cases, it was more feasible or efficient to address only some components of a system or structure with a different system or structure. The main reason for this is that some systems or structures had a small number of components WSLR because they supported the intended function(s) of another system or structure that was WSLR. In such cases, it was appropriate to evaluate aging of those few components with the other system or structure. The LRA scoping and screening results for each system or structure indicate when components were transferred to another system or structure.

Also, many plant components WSLR lend themselves to being evaluated as commodities. Commodities are addressed separately and are not addressed as part of the system or structure in which they reside. There is more discussion regarding commodities in Section 2.1.5.

2.1.4 APPLICATION OF LICENSE RENEWAL SCOPING CRITERION

2.1.4.1 Safety-Related Criteria Pursuant to 10 CFR 54.4(a)(1) (Criterion 1)

As stated above, 10 CFR 54.4(a)(1) states that SSCs within the scope of license renewal include safety related (SR) SSCs that are relied upon to remain functional during and following design basis events [as defined in 10 CFR 50.49(b)(1)] to ensure the following functions:

- the integrity of the reactor coolant pressure boundary;
- the capability to shut down the reactor and maintain it in a safe shutdown condition; or
- the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposure comparable to those referred to in 10 CFR 50.34(a)(1), 10 CFR 50.67(b)(2), or 10 CFR 100.11, as applicable.

NMPNS has an established safety classification process that identifies and documents the safety related functions of SSCs. The SR criterion used in that process satisfies the definition of SR specified in 10 CFR 54.4(a)(1)[2]. The Maintenance Rule scoping documents are the primary repository of system function classifications, and the MEL (Q-List) is the primary repository of component classifications. Thus the Maintenance Rule scoping documents were used as the main source for identifying safety related system functions that satisfy Criterion 1. Supporting information from the USAR, Technical Specifications, design documents, design drawings and MEL (Q-List) were reviewed to ensure all safety related system functions were properly identified.

Implementation of the License Renewal Scoping and Screening procedure ensured that the USAR, Technical Specifications, Maintenance Rule scoping documents, design documents, design drawings and MEL (Q-List) were reviewed, as applicable, to ensure all system functions were identified and evaluated against this criterion.

2.1.4.1.1 Conclusion

Based on this review, the license renewal intended functions relative to the criteria of 10 CFR 54.4(a)(1) were identified and documented. Thus, the scoping process used to identify SR systems and structures is consistent with, and satisfies the criteria of, 10 CFR 54.4(a)(1).

2.1.4.2 Non-Safety Related Criteria Pursuant to 10 CFR 54.4(a)(2) (Criterion 2)

As stated above, 10 CFR 54.4(a)(2) states that SSCs WSLR include Non-Safety Related (NSR) SSCs whose failure could prevent satisfactory accomplishment of any of the Criterion 1 functions of SSCs.

The process used to review SSCs for 10 CFR 54.4(a)(2) applicability ensured that the USAR, Technical Specifications, Maintenance Rule scoping documents, design documents, design drawings and MEL (Q-List) were reviewed as applicable to ensure all non-safety SSC functional interactions were identified where a non-safety SSC could fail and prevent the satisfactory accomplishment of an SR intended function. In this manner, the non-safety related SSCs meeting the criterion that are explicitly identified in

[2] In addition to the guidelines of 10 CFR 100.11, the safety-related criterion of 10 CFR 54.4(a)(1)(iii) includes reference to the dose guidelines of 10 CFR 50.34(a)(1) and 10 CFR 50.67(b)(2). These guidelines appiy to facilities seeking a construction permit and to facilities seeking to revise the current accident source term used in their design basis radiological analyses, respectively, and are not applicable to NMPNS.

the current licensing basis, such as pipe whip restraints in Unit 2, were identified.

Three additional items warrant further clarification and discussion: supports for NSR equipment, NSR piping in proximity to SR equipment, and SR/NSR piping interfaces.

2.1.4.2.1 Supports for NSR Equipment

Component supports required for NSR SSCs to prevent physical interactions with SR SSCs are WSLR. These supports must remain in place such that they do not impact equipment that is required to perform an intended function in such a way as to prevent the equipment from performing its intended function. Therefore, NMPNS considers all non-safety related supports to be WSLR if located in areas housing safety-related equipment.

2.1.4.2.2 NSR Piping in Proximity to SR Equipment

NRC Interim Staff Guidance (ISG)–09, *Guidance on the Identification and Treatment of Structures, Systems, and Components which Meet 10 CFR 54.4(a)(2),* states that applicants are to consider age-related failures of non-safety related SSCs based on industry operating experience. Industry and site specific operating experience reviews indicate that piping, fittings, and equipment containing water or steam corrode, fail, and may spray or leak onto nearby equipment, whereas those containing air, gas, or oil do not. NMPNS utilized the preventive option in order to satisfy ISG-09. Therefore, NMPNS considers all non-safety related piping, fittings, and equipment containing water or steam to be WSLR if located in the vicinity of safety related equipment. Non-safety related piping, fittings, and equipment are considered to be in the vicinity of safety-related equipment if located in the same building, corridor, and floor as safety-related equipment.

2.1.4.2.3 SR/NSR Piping Interface

The scoping and screening process for mechanical systems utilized plant drawings to graphically represent components requiring AMR. When the plant drawings show component classification boundaries at valves, actual classification boundaries extend to the first seismic anchor[3] beyond the depicted class change. At a minimum, the piping between the depicted classification boundary and the first seismic anchor is considered to be WSLR. The actual location of these seismic anchors is not depicted on

[3] For NMP1, the term “seismic anchor” means a series of supports and changes in a piping geometry that combine to provide restraint to the piping in six degrees of freedom. For NMP2, the term “seismic anchor” means an actual anchor that provides restraint to the piping in six degrees of freedom.

license renewal drawings. However as stipulated above, all non-safety related piping, fittings, and equipment containing water or steam are considered to be WSLR if located in the vicinity of safety related equipment. Thus for piping containing water or steam, the NSR portion WSLR extends beyond the depicted class change until no longer in the vicinity of safety related equipment or until the first seismic anchor is reached, whichever is furthest.

2.1.4.2.4 Conclusion

The review of site and industry operating experience did not identify any issues other than those stipulated above that are applicable to NMPNS. Based on these reviews, the license renewal intended functions relative to the criteria of 10 CFR 54.4(a)(2) were identified and documented. Thus, the scoping process used to identify NSR SSCs affecting SR intended functions is consistent with, and satisfies the criteria of, 10 CFR 54.4(a)(2).

2.1.4.3 Regulated Event Scoping Pursuant to 10 CFR 54.4(a)(3) (Criterion 3)

As previously noted, 10 CFR 54.4(a)(3) states that SSCs WSLR include all SSCs relied on in safety analyses or plant evaluations to demonstrate 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).

The process used to review SSCs for 10 CFR 54.4(a)(3) applicability ensured that the USAR, Technical Specifications, Maintenance Rule scoping documents, design documents, design drawings, and MEL (Q-List) were reviewed as applicable to ensure all SSCs credited for compliance with the regulated event set were identified and evaluated against this criteria. Specific scoping for each regulated event is described in the following sections.

2.1.4.3.1 Fire Protection (FP)

NMP1 USAR Sections X.10A, *Fire Hazards Analysis*, X.10B, *Safe Shutdown Analysis*, and X.K, *Fire Protection Program* and NMP2 USAR Section 9.5.1, *Fire Protection Systems*, describe the station fire protection and post fire safe shutdown equipment. Fire protection, detection, mitigation, confinement, and safe shutdown equipment used at the station was reviewed during the scoping process.

Evaluations were performed on equipment needed to meet the fire protection requirements of Appendix A to Branch Technical Position APCSB 9.5-1, *Guidelines for Fire Protection for Nuclear Power Plants* (Reference 2.1-2), as well as those needed to meet 10 CFR 50, Appendix R and 10 CFR 50.48. These evaluations were used as fire protection scoping basis documents. Structures and systems that contain components relied on to protect SR structures and components and equipment required to mitigate off-site release from a fire or explosion are WSLR.

2.1.4.3.2 Environmental Qualification (EQ)

The master list of EQ components is detailed in each unit's MEL. Systems that contain components identified in the EQ master equipment list, as defined by 10 CFR 50.49, are WSLR.

2.1.4.3.3 Pressurized Thermal Shock (PTS)

PTS is an issue for Pressurized Water Reactors. NMP1 and NMP2 are BWRs. Therefore, scoping for this criterion is not applicable.

2.1.4.3.4 Anticipated Transients Without Scram (ATWS)

NMP1 USAR Section VIII.A.1.2, *Anticipated Transients Without Scram Mitigation System and NMP2 USAR Section 15.8, Anticipated Transient Without Scram,* describe the system(s) installed to conform to 10 CFR 50.62. Components in the system that are credited for compliance with 10 CFR 50.62 are included in the scope of license renewal. Systems that contain those components are WSLR.

2.1.4.3.5 Station Blackout (SBO)

As part of the NMPNS license renewal effort, plant documents were reviewed to identify systems, structures, and associated intended functions required for compliance with 10 CFR 50.63, *Loss of All Alternating Current Power*, also referred to as Station Blackout (SBO). During an SBO event, this equipment is required to ensure the NMP plant(s) have the capability to withstand (cope) and recover from the loss of offsite and onsite AC power for a four hour coping duration.

The offsite power system is credited as a means of recovering from a SBO. For the purpose of the LR rule, the NRC staff has determined that the plant system portion of the offsite power system that is used to connect the plant to the offsite power source should be included within the scope of the rule (Reference 2.1-6). This path typically includes the switchyard circuit breakers that connect to the offsite system power transformers, the transformers themselves, the intervening overhead or underground circuits between the circuit breakers and transformers, and associated control circuits and structures.

Based on the guidance in Reference 2.1-6 for Station Blackout recovery, an additional evaluation was performed at NMP to determine, and bring into scope of LR, components credited for recovery of the offsite power system. For each of the systems credited for SBO recovery, a scoping/screening report was developed. Additionally, an Aging Management Review was performed for all long-lived passive structures and components within these systems.

A list of the NMP1 and NMP2 SBO recovery systems is provided below:

- NMP1 4.16KV AC Electrical Distribution System (Section 2.5.A.5)
- NMP1 115KV AC Electrical Distribution System (Section 2.5.A.6)
- NMP2 Reserve Station Service Transformers System (Section 2.5.B.21)
- NMP2 Switchyard System (Section 2.5.B.29)

2.1.4.3.6 Conclusion

Based on the above, the license renewal scoping process used to identify the applicable intended functions and SSCs relied upon to mitigate the regulated events is consistent with, and satisfies the criteria of, 10 CFR 54.4(a)(3).

2.1.5 COMPONENT SCREENING

The requirement to identify SCs subject to AMR is specified in 10 CFR 54.21(a)(1):

Each application must contain the following information:

(a) An integrated plant assessment (IPA). The IPA must:

(1) For those systems, structures, and components within the scope of this part, as delineated in §54.4, identify and list those structures and components subject to an aging management review. Structures and components subject to an aging management review shall encompass those structures and components -

(i) That perform an intended function, as described in §54.4 without moving parts or without a change in configuration or properties. These structures and components include, but are not limited to, the reactor vessel, the reactor coolant

system pressure boundary, steam generators, the pressurizer, piping, pump casings, valve bodies, the core shroud, component supports, pressure retaining boundaries, heat exchangers, ventilation ducts, the containment, the containment liner, electrical and mechanical penetrations, equipment hatches, seismic Category 1 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.*

The screening portion of the IPA methodology was divided into three engineering disciplines; mechanical, civil, and electrical and instrumentation and control (I&C). The relevant aspects of the component screening process for mechanical systems, civil structures, structural commodity groups, and electrical and I&C systems are described below in Sections 2.1.5.1 through 2.1.5.4, followed by generic screening considerations in Section 2.1.5.5.

2.1.5.1 Mechanical Systems

For mechanical systems, the component screening process was performed on each system identified to be WSLR. This process determined which components of in-scope mechanical systems require AMR.

The portions of mechanical systems that perform intended functions were established for each system WSLR. This was done by mapping the pressure boundary associated with system intended functions onto the system diagrams.

The steps performed on each mechanical system WSLR were as follows:

- Based on a review of design drawings and the system component list from the MEL database, components that are included within the system were identified.
- Based on the plant level scoping results, the pressure boundary associated with system intended functions was mapped onto the system diagrams. The intended function markups for a system have been defined consistent with the boundaries established in the CLB. Those boundaries

do not always coincide with pipe class changes. As described in Section 2.1.4.2, actual aging management evaluation boundaries may extend beyond the graphical depiction of the screening boundary on system drawings.

- Active components were identified and eliminated from further consideration with regard to AMR. Passive components (those that function without moving parts or without a change in configuration or properties) were identified for further review [screening criterion of 10 CFR 54.21(a)(1)(i)]. Active/passive screening determinations were based on the guidance in NEI-95-10 (Reference 2.1-3). Housings of ventilation components were considered to form an integral part of the pressure-retaining boundary analogous to valve bodies and pump casings.

- The passive, in-scope components that are not subject to replacement based on a qualified life or specified time period [screening criterion of 10 CFR 54.21(a)(1)(ii)] were identified as requiring an AMR. The determination of whether a passive, in-scope component has a qualified life or specified replacement time period was based on a review of maintenance programs and procedures.

- Component intended functions for components that are subject to AMR were identified. The component intended functions identified were based on the guidance of Reference 2.1-3.

2.1.5.2 Civil Structures

For structures, the screening process was performed on each structure identified to be WSLR. This method evaluated the SCs included within in-scope structures to identify specific SCs or SC groups that require an AMR.

The steps performed on each structure determined to be WSLR were as follows:

- Based on a review of CLB documents and the MEL database, SCs that are included within a structure were identified. These SCs include items such as walls, pipe and equipment supports, conduit, cable trays, electrical enclosures, instrument panels, pipe whip restraints, fire barriers, liners, sump screens, doors, blowout panels, flood barriers, missile shields, and jet impingement shields relied upon in the licensing basis. As indicated in Section 2.1.4.2, structural components required to support NSR components to prevent physical interactions with SR equipment are WSLR. These supports must remain in place such that the NSR components do not impact equipment that is required to perform an intended function in such a way as to prevent the equipment from performing its intended function.

- The SCs that are WSLR (i.e., required to perform intended functions) were identified.

- The in-scope SCs that perform an intended function without moving parts or without a change in configuration or properties [screening criterion of 10 CFR 54.21(a)(1)(i)] were identified. Active/passive screening determinations were based on the guidance in Appendix B of Reference 2.1-3.

- The passive, in-scope SCs that are not subject to replacement based on a qualified life or specified time period [screening criterion of 10 CFR 54.21(a)(1)(ii)] were identified as requiring an AMR. The determination of whether a passive, in-scope SC has a qualified life or specified replacement time period was based on a review of maintenance programs and procedures.

- Component intended functions for SCs that are subject to AMR were identified. The component intended functions identified were based on the guidance of Reference 2.1-3.

2.1.5.3 Structural Commodity Groups

Civil structures WSLR also house and support functionally unique features that may be included WSLR. These structural elements are best-described and evaluated within structural commodity groupings.

Example:The Auxiliary Building contains hundreds of fire barriers and seals. Most of these barriers perform a license renewal intended function. Rather than listing all of the barrier numbers as a subset of the Auxiliary Building components, the barriers are binned together in a commodity group and addressed as a group.

The structural commodity evaluation groups are:

- Component Supports (Section 2.4.C.1)

- Fire Stops and Seals (Section 2.4.C.2)

2.1.5.4 Electrical and Instrumentation & Control (I&C) Systems

The screening methodology employed for electrical and I&C components was consistent with the guidance in NEI 95-10 (Reference 2.1-3). All passive long-lived electrical components were evaluated as commodities regardless of the system or structure in which they reside in the MEL. As a result, the electrical systems only contain active components that are not subject to AMR. An AMR was then conducted on a commodity basis for the entire population of passive long-lived components. Identification of individual components that perform intended functions was not performed.

Electrical and I&C components associated with the 10 CFR 50.49 program (EQ) are replaced on a specified interval based on a qualified life. Therefore, components in the EQ program do not meet the “long-lived” criteria of 10 CFR 54.21(a)(1)(ii). They are “short-lived” per the regulatory definition and are not subject to AMR.

Based on a review of the USAR, the MEL, design basis documents, previous license renewal applications, and Reference 2.1-3, the following list represents the passive electrical and I&C component commodity groups at NMPNS:

- Cables and Connectors (including splices, connectors, terminal blocks, and fuse holders) (Section 2.5.C.1)

- Non-Segregated/Switchyard Bus (Section 2.5.C.2)

- Containment Electrical Penetrations (Section 2.5.C.3)

- Switchyard Components (Section 2.5.C.4)

The interface of electrical and I&C components with other types of components, and the assessments of these interfacing components, are provided in the appropriate mechanical or civil/structural sections. For example, the assessment of electrical racks, panels, frames, cabinets, cable trays, conduit, and their supports is provided in the civil/structural assessment documented in Section 2.4.

2.1.5.5 Consumables

Consistent with References 2.1-1 and 2.1-3, consumables may be divided into the following four categories for the purpose of license renewal: (a) packing, gaskets, component seals, and O-rings; (b) structural sealants; (c) oil, grease, and component filters; and (d) system filters, fire extinguishers, fire hoses, and air packs. The consumables in both category (a) and (b) are considered as subcomponents and are not explicitly called out in the scoping and screening procedures. Rather, they are implicitly included at the component level (e.g., if a valve is identified as being in scope, a seal in that valve would also be in scope as a subcomponent of that valve). For category (a), these subcomponents can be excluded using a clear basis, such as items that are not considered pressure boundaries in applicable design codes. For category (b), these subcomponents may perform functions without moving parts or a change in configuration, and they are not typically replaced. The consumables in category (c) are short-lived and periodically replaced, and can be excluded from an AMR on that basis. Likewise, the consumables that fall within category (d) are typically replaced based on performance or condition monitoring. More details for each of these areas are provided below.

2.1.5.5.1 Packing, Gaskets, Component Seals, And O-Rings

Packing, gaskets, component mechanical seals, and O-rings are typically used to provide a leak-proof seal when components are mechanically joined together. These items are commonly found in components such as valves, pumps, heat exchangers, ventilation units/ducts, and piping segments. These types of consumables are considered subcomponents of the identified components and, therefore, are not subject to their own condition or performance monitoring. Packing, gaskets, component seals, and O-rings are excluded from AMR, as they are not considered pressure boundaries in ASME Section III or USAS B31.1 or USAS B31.7. Otherwise, the AMR for the component included an evaluation of the sealing materials in those instances where it could not be demonstrated that one of the following conditions exist:

1. The sealing materials are short-lived because they are replaced on a fixed frequency or have a qualified life established, or
2. The sealing materials are not relied on in the CLB to maintain any of the following:
    - Leakage below established limits
    - System pressure high enough to deliver specified flow rates
    - A pressure envelope for a space

2.1.5.5.2 Structural Sealants

These types of sealants historically are not replaced on a fixed interval and do not have qualified lives. Therefore, seals determined to be WSLR are treated as long-lived items and subject to an AMR.

2.1.5.5.3 Oil, Grease, and Filters

Oil, grease, and component filters do not require an AMR because they are periodically replaced; therefore, they are short-lived.

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

Components such as system filters, fire hoses and fire extinguishers, and air packs are considered to be consumables. Those determined to be WSLR are not subject to AMR and are replaced based on condition or performance monitoring by the following programs. System filter replacement is performed in accordance with the NMPNS Periodic Surveillance and Preventive Maintenance Program. Fire extinguisher replacement is in accordance with NFPA 10, *Standard for Portable Fire Extinguishers*. Fire hose replacement is in accordance with NFPA 1962, *Standard for the Care, Use and Service Testing of Fire Hose Including Couplings and Nozzles*. Air packs are replaced in accordance with ANSI Z88.2-1992, *Practices for Respiratory Protection.*

2.1.5.6 Conclusion

Based on the above, the license renewal component screening process used to identify the SCs that require an AMR is consistent with, and satisfies the criteria of, 10 CFR 54.21(a)(1).

2.1.6 INTERIM STAFF GUIDANCE (ISG) DISCUSSION

This section presents a summary of the NMPNS response to the following ISGs:

ISG NO.	ISG TITLE	SECTION NO.
ISG-01	Position of the GALL Report Presenting One Acceptable Way to Manage Aging Effects for License Renewal	Section 2.1.6.1
ISG-02	Scoping of Equipment Relied on to Meet the Requirements of the Station Blackout (SBO) Rule (10 CFR Part 50.63) for License Renewal (10 CFR 54.4(a)(3))	Section 2.1.6.2
ISG-03	Chapters II and III of Generic Aging Lessons Learned (GALL) Report on Aging Management of Concrete Elements	Section 2.1.6.3
ISG-04	Aging Management of Fire Protection Systems for License Renewal	Section 2.1.6.4
ISG-05	Identification and Treatment of Electrical Fuse Holders for License Renewal	Section 2.1.6.5
ISG-06	Identification and Treatment of Housing for Active Components	Section 2.1.6.6
ISG-07	Scoping Guidance for Fire Protection (FP) Equipment for License Renewal	Section 2.1.6.7
ISG-08	Updating the Improved License Renewal Guidance Documents	Section 2.1.6.8
ISG-09	Guidance on the Identification and Treatment of Structures, Systems, and Components which Meet 10 CFR 54.4(a)(2)	Section 2.1.6.9
ISG-10	Standard License Renewal Application Format	Section 2.1.6.10
ISG-11	Environmental Assisted Fatigue for Carbon/Low-Alloy Steel	Section 2.1.6.11
ISG-12	Addition of Generic Aging Lessons Learned (GALL) Aging Management Program (AMP) XI.M35, “One-Time Inspection of Small-Bore Piping,” for License Renewal	Section 2.1.6.12
ISG-13	Management of Loss of Preload on Reactor Vessel Internals Bolting Using the Loose Parts Monitoring System	Section 2.1.6.13
ISG-14	Operating Experience with Cracking in Bolting	Section 2.1.6.14
ISG-15	Revision of Generic Aging Lessons Learned (GALL) Aging Management Program (AMP) XI.E2, "Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits"	Section 2.1.6.15
ISG-16	Time-Limited Aging Analyses (TLAAs) Supporting Information For License Renewal Applications	Section 2.1.6.16
ISG-17	Bus Ducts (Iso-phase and Non-Segregated) for Electrical Bus Bar	Section 2.1.6.17
ISG-18	Revision to NUREG-1801 Program XI.E3 for Inaccessible Medium Voltage Cable	Section 2.1.6.18

2.1.6.1 Position of the GALL Report Presenting One Acceptable Way to Manage Aging Effects for License Renewal

NUREG-1801 is used as a reference for Section 3.

2.1.6.2 Scoping of Equipment Relied on to Meet the Requirements of the Station Blackout (SBO) Rule (10 CFR Part 50.63) for License Renewal (10 CFR 54.4(a)(3))

Scoping related to SBO is discussed in Section 2.1.4.3.5. Scoping is in accordance with the ISG.

2.1.6.3 Chapters II and III of Generic Aging Lessons Learned (GALL) Report on Aging Management of Concrete Elements

Concrete subject to aging management review has been included in an aging management program in accordance with the ISG. This includes concrete for which no aging effects requiring management were identified (see Section 3.5).

2.1.6.4 Aging Management of Fire Protection Systems for License Renewal

This ISG dealt with three aspects of the Fire Protection (FP) system aging management program.

<u>Wall Thinning of FP Piping due to Internal Corrosion</u>

As stated in the ISG, disassembling portions of the FP piping as described in NUREG-1801 Chapter XI.M27 may not be the most effective means to detect this aging effect. The use of a non-intrusive means of evaluating wall thickness is recommended. The Fire Water System Program (Appendix B2.1.17) will address the means of evaluating wall thickness.

<u>Testing of Sprinkler Heads</u>

The Fire Water System Program (Appendix B2.1.17) includes the applicable National Fire Protection Association (NFPA) codes and standards.

<u>Valve Lineup Inspections of Halon/Carbon Dioxide Fire Suppression Systems</u>

The ISG states *valve lineup inspections, charging pressure inspections, and automatic mode of operation verifications for the halon/carbon dioxide system are operational activities pertaining to system or component configurations or properties that may change, and are not related to aging* *management. Therefore, the staff position is to eliminate the halon/carbon dioxide system inspections for charging pressure, valve lineups, and automatic mode of operation.* Accordingly, these inspections are not credited in the fire protection program.

2.1.6.5 Identification and Treatment of Electrical Fuse Holders for License Renewal

Fuse holders (including fuse clips and fuse blocks) are passive, long-lived electrical components that are WSLR and are subject to an AMR as part of the Cables and Connections commodity (see Section 2.1.5.4). Additionally, NMPNS credits the Fuse Holders Program (see Appendix B2.1.34) for identifying potential age-related degradation for fuse holders.

2.1.6.6 Identification and Treatment of Housing for Active Components

The NRC issued this proposed ISG for comment on May 1, 2003, and it has not yet been finalized. Housings of ventilation components form an integral part of the pressure-retaining boundary analogous to valve bodies and pump casings. As such, they require an AMR.

2.1.6.7 Scoping Guidance for Fire Protection (FP) Equipment for License Renewal

The NRC issued this proposed ISG for comment on November 13, 2002, and it has not yet been finalized. The NMPNS scoping methodology considered the guidance in this draft ISG (see Section 2.1.4.3.1).

2.1.6.8 Updating the Improved License Renewal Guidance Documents

This is a non-technical issue that has been deleted from the ISG list.

2.1.6.9 Guidance on the Identification and Treatment of Structures, Systems, and Components which Meet 10 CFR 54.4(a)(2)

The NRC issued this proposed ISG for comment on March 15, 2002, and it has not yet been finalized. 10 CFR 54.4(a)(2) states that SSCs WSLR include NSR SSCs whose failure could prevent satisfactory accomplishment of any SR intended functions of SSCs. NMPNS's position on this issue is discussed in Section 2.1.4.2.

2.1.6.10 Standard License Renewal Application Format

The NMPNS LRA closely follows the Standard License Renewal Application format in NEI 95-10, Revision 4.

2.1.6.11 Environmental Assisted Fatigue for Carbon/Low-Alloy Steel

Aging management of environmental fatigue for carbon/low-alloy steel items is discussed in Section 4.3.6.

2.1.6.12 Addition of Generic Aging Lessons Learned (GALL) Aging Management Program (AMP) XI.M35, "One-Time Inspection of Small-Bore Piping," for License Renewal

The NRC issued this proposed ISG for comment on November 3, 2003, and it has not yet been finalized. Inspection of the in-scope small-bore piping is part of the One-Time Inspection Program (see Appendix B2.1.20).

2.1.6.13 Management of Loss of Preload on Reactor Vessel Internals Bolting Using the Loose Parts Monitoring System

The NRC has identified this ISG but no guidance has been provided. NMPNS has not applied this ISG in the development of this LRA.

2.1.6.14 Operating Experience with Cracking in Bolting

The NRC has identified this ISG but no guidance has been provided. NMPNS has not applied this ISG in the development of this LRA.

2.1.6.15 Revision of Generic Aging Lessons Learned (GALL) Aging Management Program (AMP) XI.E2, "Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits"

The NRC issued this proposed ISG for comment on August 12, 2003, and it has not yet been finalized. Appendix B2.1.30 describes the Non-EQ Electrical Cables Used in Instrumentation Circuits Program, which, following enhancements, will be comparable to the program described in NUREG-1801, Chapter XI.E2.

2.1.6.16 Time-Limited Aging Analyses (TLAAs) Supporting Information For License Renewal Applications

The NRC issued this proposed ISG for comment on August 12, 2003, and it has not yet been finalized. ISG-16 addresses the level of detail of supporting information to be provided in a License Renewal Application in the discussion of TLAA evaluations. Section 4.0 documents the evaluation of TLAA. ISG-16 was considered in developing Section 4.0; however, since ISG-16 is a draft, each provision of the ISG was not necessarily incorporated.

2.1.6.17 Bus Ducts (Iso-phase and Non-Segregated) for Electrical Bus Bar

The NRC has not developed a position for this issue. The NMPNS Non-Segregated Bus Inspection Program is described in Appendix B2.1.34.

2.1.6.18 Revision to NUREG-1801 Program XI.E3 for Inaccessible Medium Voltage Cable

The NRC has not developed a position for this issue. The Non-EQ Inaccessible Medium Voltage Cables Program is described in Appendix B2.1.31).

2.1.7 REFERENCES

2.1-1 NUREG-1800, *Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants, U.S. Nuclear Regulatory Commission*, July 2001.

2.1-2 Branch Technical Position (BTP) APCSB 9.5-1, Appendix A, *Guidelines for Fire Protection for Nuclear Power Plants*, August 23, 1976.

2.1-3 NEI 95-10, *Industry Guideline for Implementing the Requirements of 10 CFR Part 54 -The License Renewal Rule*, Rev. 3, Nuclear Energy Institute, March 2001.

2.1-4 Letter of March 10, 2003 from Peter J. Kang of the NRC to Alan Nelson of NEI and David Lochbaum of the Union of Concerned Scientists, *Subject: Interim Staff Guidance (ISG) - 5 on the Identification and Treatment of Electrical Fuse Holders for License Renewal*.

2.1-5 Letter of March 10, 2000 from Christopher I. Grimes of the NRC to Douglas J. Walters of NEI, *Subject: License Renewal Issue No. 98-12, Consumables*.

2.1-6 Letter of April 1, 2002 from David B. Matthews of the NRC to Alan Nelson of NEI and David Lochbaum of the Union of Concerned Scientists, *Subject: Staff Guidance on Scoping of Equipment Relied on to Meet the Requirements of the Station Blackout (SBO) Rule (10 CFR 50.63) for License Renewal (10 CFR 54.4(a)(3))*

2.2 PLANT LEVEL SCOPING RESULTS

Table 2.2-1 and Table 2.2-2 provide the results of the plant-level scoping for each of the systems, structures, and commodities for NMP1 and NMP2, respectively. For systems, structures, and commodities that are within scope of license renewal, the section numbers of this application, where these systems, structures, and commodities are described, are given in parentheses.

TABLE 2.2-1
NMP1 PLANT LEVEL SCOPING RESULTS

Mechanical Systems		
System or Commodity	**Within Scope of License Renewal?**	**Comments**
Administration Building Heating, Ventilation, and Air Conditioning (HVAC) System (Section 2.3.3.A.1)	Yes	
Automatic Depressurization System (Section 2.3.2.A.1)	Yes	
Circulating Water System (Section 2.3.3.A.2)	Yes	
City Water System (Section 2.3.3.A.3)	Yes	
Compressed Air Systems (Section 2.3.3.A.4)	Yes	Includes the following subsystems: • Breathing Air System • House Service Air System • Instrument Air System
Condensate and Condensate Transfer System (Section 2.3.4.A.1)	Yes	
Condenser Air Removal and Off-Gas System (Section 2.3.4.A.2)	Yes	
Containment Isolation Components	Yes	Primary Containment penetration sleeves are evaluated with the Primary Containment Structure (Section 2.4.A.1). Piping that penetrates containment is evaluated with its respective system along with containment isolation valves. Primary Containment electrical penetrations are addressed in the Containment Electrical Penetrations Commodity (Section 2.5.C.3).
Containment Spray System (Section 2.3.2.A.2)	Yes	
Containment Systems (Section 2.3.3.A.5)	Yes	Includes the following subsystems: • Combustible Gas Control • Primary Containment Area Cooling • Containment Atmospheric Monitoring • Torus Temperature Monitoring • Torus Drain System • Integrated Leak Rate Monitoring
Control Rod Drive System (Section 2.3.1.A.5)	Yes	

TABLE 2.2-1
NMP1 PLANT LEVEL SCOPING RESULTS

Mechanical Systems		
System or Commodity	**Within Scope of License Renewal?**	**Comments**
Control Room HVAC System (Section 2.3.3.A.6)	Yes	
Core Spray System (Section 2.3.2.A.3)	Yes	
Diesel Generator Building Ventilation System (Section 2.3.3.A.7)	Yes	
Electric Steam Boiler System	No	
Emergency Cooling System (Section 2.3.2.A.4)	Yes	
Emergency Diesel Generator System (Section 2.3.3.A.8)	Yes	
Feedwater/High Pressure Coolant Injection System (Section 2.3.4.A.3)	Yes	
Fire Detection and Protection System (Section 2.3.3.A.9)	Yes	
Hydrogen Water Chemistry System (Section 2.3.3.A.10)	Yes	
Laboratory Systems	No	
Liquid Poison System (Section 2.3.3.A.11)	Yes	
Main Generator and Auxiliary System (Section 2.3.4.A.4)	Yes	
Main Steam System (Section 2.3.4.A.5)	Yes	
Main Turbine and Auxiliary System	No	
Makeup and Demineralizer System	No	
Miscellaneous Non Contaminated Vents and Drains System (Section 2.3.3.A.12)	Yes	
Moisture Separator Reheater Steam System	No	
Neutron Monitoring System (Section 2.3.3.A.13)	Yes	Includes the following subsystems: • Neutron Monitoring System – Intermediate Range • Neutron Monitoring System – Power Range • Neutron Monitoring System – Source Range • Neutron Monitoring System – Traversing Incore Probes
Process Radiation Monitoring System (Section 2.3.3.A.14)	Yes	
Radioactive Waste Disposal Building HVAC System (Section 2.3.3.A.15)	Yes	
Radioactive Waste System (Section 2.3.3.A.16)	Yes	Includes the Non-Radioactive Roof and Floor Drains System
Reactor Building Closed Loop Cooling System (Section 2.3.3.A.17)	Yes	
Reactor Building HVAC System (Section 2.3.3.A.18)	Yes	

TABLE 2.2-1
NMP1 PLANT LEVEL SCOPING RESULTS

Mechanical Systems		
System or Commodity	**Within Scope of License Renewal?**	**Comments**
Reactor Coolant Pressure Boundary Components In Other Systems (Section 2.3.1.A.6)	Yes	The Reactor Coolant Pressure Boundary Components of the following systems are evaluated with their assigned systems: • Core Spray System (Section 2.3.2.A.3) • Emergency Cooling System (Section 2.3.2.A.4) • Feedwater/High Pressure Coolant Injection System (Section 2.3.4.A.3) • Liquid Poison System (Section 2.3.3.A.11) • Main Steam System (Section 2.3.4.A.5) • Reactor Water Cleanup System (Section 2.3.3.A.19) • Sampling System (Section 2.3.3.A.20) • Shutdown Cooling System (Section 2.3.3.A.22)
Reactor Pressure Vessel (Section 2.3.1.A.1)	Yes	
Reactor Pressure Vessel Instrumentation System (Section 2.3.1.A.3)	Yes	
Reactor Pressure Vessel Internals (Section 2.3.1.A.2)	Yes	
Reactor Recirculation System (Section 2.3.1.A.4)	Yes	
Reactor Water Cleanup System (Section 2.3.3.A.19)	Yes	
Resin Transfer and Regeneration System	No	
Sampling System (Section 2.3.3.A.20)	Yes	
Sanitary Sewerage System	No	
Screen and Pumphouse Building HVAC System	No	
Service Water System (Section 2.3.3.A.21)	Yes	Includes the Emergency Service Water System
Shutdown Cooling System (Section 2.3.3.A.22)	Yes	
Spent Fuel Pool Filtering and Cooling System (Section 2.3.3.A.23)	Yes	
Technical Support Center HVAC System (Section 2.3.3.A.24)	Yes	
Turbine Building Closed Loop Cooling Water System (Section 2.3.3.A.25)	Yes	

TABLE 2.2-1
NMP1 PLANT LEVEL SCOPING RESULTS

Mechanical Systems		
System or Commodity	**Within Scope of License Renewal?**	**Comments**
Turbine Building HVAC System (Section 2.3.3.A.26)	Yes	

TABLE 2.2-1
NMP1 PLANT LEVEL SCOPING RESULTS

Electrical Systems		
System or Commodity	**Within Scope of License Renewal?**	**Comments**
24V DC Electrical Distribution System (Section 2.5.A.1)	Yes	
125V DC Electrical Distribution System (Section 2.5.A.2)	Yes	
120V AC Electrical Distribution System (Section 2.5.A.3)	Yes	
345KV AC Electrical Distribution System	No	
480V AC Electrical Distribution System	No	
600V AC Electrical Distribution System (Section 2.5.A.4)	Yes	
4.16KV AC Electrical Distribution System (Section 2.5.A.5)	Yes	
115KV AC Electrical Distribution System (Section 2.5.A.6)	Yes	
Annunciator System	No	
Anticipated Transient Without Scram System (Section 2.5.A.7)	Yes	
Area Radiation Monitoring System	No	
Cables and Connectors Commodity (Section 2.5.C.1)	Yes	
Communications System (Section 2.5.A.8)	Yes	
Containment Electrical Penetrations Commodity (Section 2.5.C.3)	Yes	
Control Room Miscellaneous System	No	
Non-Segregated/Switchyard Bus Commodity (Section 2.5.C.2)	Yes	
Plant Lighting System (Section 2.5.A.9)	Yes	
Plant Process Computer System (Section 2.5.A.10)	Yes	
Reactor Protection System (Section 2.5.A.11)	Yes	
Remote Shutdown System (Section 2.5.A.12)	Yes	
Safety Parameter Display System	No	
Security System	No	
Seismic Recording System	No	
Spares System	No	The Spares System encompasses breakers, fuses, indicators, and switches installed in plant systems as spares.
Switchyard Components Commodity (Section 2.5.C.4)	Yes	
Weather Station	No	

TABLE 2.2-1
NMP1 PLANT LEVEL SCOPING RESULTS

Structures and Component Supports		
System, Structure, or Commodity	**Within Scope of License Renewal?**	**Comments**
Component Supports Commodity (Section 2.4.C.1)	Yes	
Essential Yard Structures (Section 2.4.A.3)	Yes	
Fire Stops and Seals Commodity (Section 2.4.C.2)	Yes	
Fuel Handling System (Section 2.4.A.4)	Yes	
Material Handling System (Section 2.4.A.5)	Yes	
Non-essential Yard Structures	No	
Offgas Building (Section 2.4.A.6)	Yes	
Personnel/Equipment Access System (Section 2.4.A.7)	Yes	
Primary Containment Structure(Section 2.4.A.1)	Yes	
Radwaste Solidification and Storage Building (Section 2.4.A.8)	Yes	
Reactor Building (Section 2.4.A.2)	Yes	
Screen and Pumphouse Building (Section 2.4.A.9)	Yes	
Turbine Building (Section 2.4.A.10)	Yes	
Vent Stack (Section 2.4.A.11)	Yes	
Waste Disposal Building (Section 2.4.A.12)	Yes	
Yard System	No	The Yard system consists of a peripheral drain at the exterior of the buildings for the removal of ground water seepage. The system and components have no intended functions.

TABLE 2.2-2
NMP2 PLANT LEVEL SCOPING RESULTS

Mechanical Systems		
System or Commodity	**System or Commodity**	**System or Commodity**
Air Startup – Standby Diesel Generator System (Section 2.3.3.B.1)	Yes	
Alternate Decay Heat Removal System (Section 2.3.3.B.2)	Yes	
Automatic Depressurization System (Section 2.3.2.B.1)	Yes	
Auxiliary Boiler Room Ventilation System	No	
Auxiliary Boiler System	No	
Auxiliary Service Building HVAC System (Section 2.3.3.B.3)	Yes	
Cardox Fire Protection - Low Pressure Carbon Dioxide System	Yes	See Fire Detection and Protection System (Section 2.3.3.B.13)
Chemical Feed System – Acid	No	
Chemical Feed System – Hypochlorite	No	
Chilled Water Ventilation System (Section 2.3.3.B.4)	Yes	
Circulating Water System	No	
Compressed Air Systems (Section 2.3.3.B.5)	Yes	Includes the following subsystems: • Breathing Air System • Instrument Air System • Nitrogen System • Service Air System
Condensate System (Section 2.3.4.B.2)	Yes	Includes the following subsystems: • Auxiliary Condensate System • Condensate Booster Pump Lube Oil System • Condensate Demineralizer System • Condensate Demineralizer System – Mixed Bed • Condensate Makeup and Drawoff System
Containment Atmosphere Monitoring System (Section 2.3.3.B.6)	Yes	

TABLE 2.2-2
NMP2 PLANT LEVEL SCOPING RESULTS

Mechanical Systems		
System or Commodity	**System or Commodity**	**System or Commodity**
Containment Isolation Components	Yes	Primary Containment penetration sleeves are evaluated with the Primary Containment Structure (Section 2.4.B.1). Piping that penetrates containment is evaluated with its respective system along with containment isolation valves. Primary Containment electrical penetrations are addressed in the Containment Electrical Penetrations Commodity (Section 2.5.C.3).
Containment Leakage Monitoring System (Section 2.3.3.B.7)	Yes	
Control Building Chilled Water System (Section 2.3.3.B.8)	Yes	
Control Building HVAC System (Section 2.3.3.B.9)	Yes	
Control Rod Drive System (Section 2.3.1.B.5)	Yes	
Crack Arrest Verification System	No	
Decontamination System	No	
Diesel Generator Building Ventilation System (Section 2.3.3.B.10)	Yes	
Domestic Water System (Section 2.3.3.B.11)	Yes	
Drywell Cooling System	No	
Engine-Driven Fire Pump Fuel Oil System (Section 2.3.3.B.12)	Yes	
Extraction Steam and Feedwater Heater Drains System	No	
Feedwater System (Section 2.3.4.B.3)	Yes	Includes the following subsystems: • Feedwater Pump Drive Lube Oil System • Feedwater Pump Recirculation Balance Drum Leakoff System • Feedwater Pump Seals and Leakoff System
Fire Detection and Protection System (Section 2.3.3.B.13)	Yes	This system was created in the License Renewal Application to be consistent with NMP1.
Fire Detection System	Yes	See Fire Detection and Protection System (Section 2.3.3.B.13)

TABLE 2.2-2
NMP2 PLANT LEVEL SCOPING RESULTS

Mechanical Systems		
System or Commodity	**System or Commodity**	**System or Commodity**
Fire Protection Foam System	Yes	See Fire Detection and Protection System (Section 2.3.3.B.13)
Fire Protection Halon System	Yes	See Fire Detection and Protection System (Section 2.3.3.B.13)
Fire Protection Water System	Yes	See Fire Detection and Protection System (Section 2.3.3.B.13)
Floor and Equipment Drains System (Section 2.3.3.B.14)	Yes	Includes the following subsystems: • Miscellaneous Floor and Equipment Drains System • Radwaste Building Floor and Equipment Drains System • Reactor Building Floor Drains System • Reactor Building Equipment Drains System • Service Building Floor and Equipment Drains System • Standby Diesel Generator Building Floor and Equipment Drains System • Turbine Building Floor and Equipment Drains System • Turbine Plant Miscellaneous Drains System
Generator Standby Lube Oil System (Section 2.3.3.B.15)	Yes	Includes the Generator Standby Temperature System
Glycol Heating System (Section 2.3.3.B.16)	Yes	
High-Pressure Core Spray System (Section 2.3.2.B.3)	Yes	
Hot Water Heating System (Section 2.3.3.B.17)	Yes	
Hydro Pump System	No	
Hydrogen Recombiner System (Section 2.3.2.B.2)	Yes	
Hydrogen Water Chemistry System	No	
Loose Parts Monitoring System	No	
Low-Pressure Core Spray System (Section 2.3.2.B.4)	Yes	
Main Condenser Air Removal System (Section 2.3.4.B.1)	Yes	

TABLE 2.2-2
NMP2 PLANT LEVEL SCOPING RESULTS

Mechanical Systems		
System or Commodity	**System or Commodity**	**System or Commodity**
Main Generator System	No	Includes the following subsystems: • Excitation-Main Generator System (Cooling) • Excitation Main Generator System (Power Circuits) • Generator Hydrogen • Generator Carbon Dioxide System • Generator Isolation Phase Bus Cooling System • Generator Main Seal Oil System • Generator Stator Cooling Water System
Main Steam System (Section 2.3.4.B.4)	Yes	Includes the following subsystems: • Auxiliary Steam System • Main Steam Safety Valves Vents and Drains System
Makeup Water System (Section 2.3.3.B.18)	Yes	
Moisture Separator Reheat System (Section 2.3.4.B.5)	Yes	Includes the following subsystems: • Cold Reheat Steam • Hot Reheat Steam • Moisture Separator and Reheater Vents • Moisture Separator Vents and Drains System
Neutron Monitoring System (Section 2.3.3.B.19)	Yes	This system was created in the License Renewal Application to be consistent with NMP1.
Neutron Monitoring System – Intermediate Range	Yes	See Neutron Monitoring System (Section 2.3.3.B.19)
Neutron Monitoring System – Power Range	Yes	See Neutron Monitoring System (Section 2.3.3.B.19)
Neutron Monitoring System – Source Range	Yes	See Neutron Monitoring System (Section 2.3.3.B.19)
Neutron Monitoring System - Traversing Incore Probes	Yes	See Neutron Monitoring System (Section 2.3.3.B.19)
Offgas System	No	
Oxygen Feedwater Injection System	No	

TABLE 2.2-2
NMP2 PLANT LEVEL SCOPING RESULTS

Mechanical Systems		
System or Commodity	**System or Commodity**	**System or Commodity**
Primary Containment Isolation System (Section 2.3.2.B.5)	Yes	The excess flow check valves on instrument lines that penetrate primary containment are considered part of the Primary Containment Isolation System.
Primary Containment Purge System (Section 2.3.3.B.20)	Yes	
Process Sampling System (Section 2.3.3.B.21)	Yes	Includes the following subsystems: • Chemistry Lab Sampling System • Post-Accident Sampling System • Radwaste Building Sampling System • Reactor Plant Sampling System • Turbine Plant Sampling System
Radiation Monitoring System (Section 2.3.3.B.22)	Yes	
Radioactive Liquid Waste Management System	No	
Radioactive Solid Waste Management System	No	
Radwaste Building Ventilation System	No	
Reactor Building Closed-Loop Cooling Water System (Section 2.3.3.B.23)	Yes	
Reactor Building HVAC System (Section 2.3.3.B.24)	Yes	

TABLE 2.2-2
NMP2 PLANT LEVEL SCOPING RESULTS

Mechanical Systems		
System or Commodity	**System or Commodity**	**System or Commodity**
Reactor Coolant Pressure Boundary Components In Other Systems (Section 2.3.1.B.6)	Yes	The Reactor Coolant Pressure Boundary Components of the following systems are evaluated with their assigned systems: • Feedwater System (Section 2.3.4.B.3) • Floor and Equipment Drains System (Section 2.3.3.B.14)[1] • High-Pressure Core Spray System (Section 2.3.2.B.3) • Low-Pressure Core Spray System (Section 2.3.2.B.4) • Main Steam System (Section 2.3.4.B.4) • Reactor Core Isolation Cooling System (Section 2.3.2.B.6) • Reactor Water Cleanup System (Section 2.3.3.B.25) • Residual Heat Removal System (Section 2.3.2.B.7) • Standby Liquid Control System (Section 2.3.3.B.31)
Reactor Core Isolation Cooling System (Section 2.3.2.B.6)	Yes	
Reactor Pressure Vessel (Section 2.3.1.B.1)	Yes	
Reactor Pressure Vessel Instrumentation System (Section 2.3.1.B.3)	Yes	
Reactor Pressure Vessel Internals (Section 2.3.1.B.2)	Yes	
Reactor Recirculation System (Section 2.3.1.B.4)	Yes	
Reactor Water Cleanup System (Section 2.3.3.B.25)	Yes	
Residual Heat Removal System (Section 2.3.2.B.7)	Yes	
Roof Drainage, Storm, and Waste Water System	No	
Roof Drains System	No	
Roof Drains System – Turbine Bldg	No	
Sanitary Plumbing and Drains System	No	

[1] This system includes the Reactor Building Floor Drains System which has components that ensure reactor vessel flange seal integrity.

TABLE 2.2-2
NMP2 PLANT LEVEL SCOPING RESULTS

Mechanical Systems		
System or Commodity	**System or Commodity**	**System or Commodity**
Seal Water System (Section 2.3.3.B.26)	Yes	
Service Building and Access Passageway Ventilation System	No	
Service Water Chemical Treatment System	No	
Service Water System (Section 2.3.3.B.27)	Yes	
Spent Fuel Pool Cooling and Cleanup System (Section 2.3.3.B.28)	Yes	
Standby Diesel Generator Fuel Oil System (Section 2.3.3.B.29)	Yes	
Standby Diesel Generator Protection (Generator) System (Section 2.3.3.B.30)	Yes	
Standby Gas Treatment System (Section 2.3.2.B.8)	Yes	
Standby Liquid Control System (Section 2.3.3.B.31)	Yes	
Traveling Screens Wash and Disposal System	No	
Turbine Building Closed-Loop Cooling Water System	No	
Turbine Building Ventilation System	No	
Turbine Main System	No	Includes the following subsystems: • Main Turbine System • Turbine Electric Hydraulic Oil and Controls System • Turbine Generator Gland Seal and Exhaust Steam • Turbine Generator Lube Oil Turning Gear and Seal System • Turbine Generator Oil Conditioner and Storage System • Turbine Main Alarms and Trips System • Turbine Main Lube Oil System • Turbine Main Supervisory Instrumentation System • Turbine Plant Equipment Vents System
Waste Oil Disposal System	No	
Water Treating – Copper Trol Cu-1 (Chemical Feed) System	No	
Water Treating – Dispersant (Chemical Feed) System	No	
Water Treatment System	No	

TABLE 2.2-2
NMP2 PLANT LEVEL SCOPING RESULTS

Mechanical Systems		
System or Commodity	**System or Commodity**	**System or Commodity**
Yard Structures Ventilation System (Section 2.3.3.B.32)	Yes	
Zinc Injection System	No	

TABLE 2.2-2
NMP2 PLANT LEVEL SCOPING RESULTS

Electrical Systems		
System or Commodity	**Within Scope of License Renewal?**	**Comments**
13.8KV AC Electrical Distribution System (Section 2.5.B.1)	Yes	Includes the 13.8KV Normal and Standby AC Power Systems
4.16 KV AC Electrical Distribution System (Section 2.5.B.2)	Yes	Includes the 4.16KV Normal and Emergency AC Power Systems
Annunciator Input System	No	
Auxiliary Station Transformer System	No	
Battery-24V-Station System (Section 2.5.B.3)	Yes	
Cables and Connectors Commodity (Section 2.5.C.1)	Yes	
Common Electrical System (Section 2.5.B.4)	Yes	Includes the Control Room Complex
Communications Maintenance System	No	
Communications Paging System (Section 2.5.B.5)	Yes	
Communications Radio System	No	
Communications Sound Powered System	No	
Communications Telephone System (Section 2.5.B.6)	Yes	
Containment Electrical Penetrations Commodity (Section 2.5.C.3)	Yes	
Emergency DC Distribution System (Section 2.5.B.7)	Yes	
Emergency Uninterruptible Power Supplies (UPS) System (Section 2.5.B.8)	Yes	
Feedwater Control System (Section 2.5.B.9)	Yes	
Grounding System	No	
Heat Tracing System (Section 2.5.B.10)	Yes	
Information Handling Annunciator System (Section 2.5.B.11)	Yes	
Information Handling Security System	No	
Leak Detection System	No	
Lighting AC Auxiliary Boiler Room System	Yes	See Station Lighting System (Section 2.5.B.28)
Lighting AC Control Room Main System	Yes	See Station Lighting System (Section 2.5.B.28)
Lighting AC Cooling Tower and Pond Area System	No	
Lighting AC Diesel Generator Room System	Yes	See Station Lighting System (Section 2.5.B.28)
Lighting AC Miscellaneous Buildings System	No	
Lighting AC Radwaste Building System	Yes	See Station Lighting System (Section 2.5.B.28)

TABLE 2.2-2
NMP2 PLANT LEVEL SCOPING RESULTS

Electrical Systems		
System or Commodity	**Within Scope of License Renewal?**	**Comments**
Lighting AC Reactor Building System	Yes	See Station Lighting System (Section 2.5.B.28)
Lighting AC Screenwell and Pumphouse System	Yes	See Station Lighting System (Section 2.5.B.28)
Lighting AC Service Building System	Yes	See Station Lighting System (Section 2.5.B.28)
Lighting AC Switchyard or Substation including Control House System	No	
Lighting AC Turbine Area System	Yes	See Station Lighting System (Section 2.5.B.28)
Main Steam Line Isolation Valve Seals System	No	
Meteorological Monitoring System	No	
Motor Control Center-Emergency-System (Section 2.5.B.12)	Yes	
Non-Segregated/Switchyard Bus Commodity (Section 2.5.C.2)	Yes	
Normal AC High Voltage Distribution System (Section 2.5.B.13)	Yes	
Normal DC Distribution System (Section 2.5.B.14)	Yes	
Normal UPS System (Section 2.5.B.15)	Yes	
Plant Computer Network	No	
Power Outlet General Purpose 3 Phase System	No	
Process Computer System (Section 2.5.B.16)	Yes	Includes the Plant Data Historian System
Protection Cathodic System	No	
Reactor Manual Control/Rod Position Indication System	No	
Reactor Protection Motor Generator System (Section 2.5.B.17)	Yes	
Reactor Protection System (Section 2.5.B.18)	Yes	
Redundant Reactivity Control System (Section 2.5.B.19)	Yes	
Remote Shutdown System (Section 2.5.B.20)	Yes	
Reserve Station Service Transformers (Section 2.5.B.21)	Yes	
Seismic Monitoring System	No	
Standby and Emergency AC Distribution System (Section 2.5.B.22)	Yes	
Standby Diesel Generator Protection (Breaker) (Section 2.5.B.23)	Yes	

TABLE 2.2-2
NMP2 PLANT LEVEL SCOPING RESULTS

Electrical Systems		
System or Commodity	**Within Scope of License Renewal?**	**Comments**
Startup Transient Analysis System (Section 2.5.B.24)	Yes	
Station Control Bus Nonvital AC Supply System (Section 2.5.B.25)	Yes	
Station Control Bus Nonvital Indication System (Section 2.5.B.26)	Yes	
Station Control Bus Vital AC Supply System (Section 2.5.B.27)	Yes	
Station Lighting System (Section 2.5.B.28)	Yes	This system is equivalent to the NMP1 Plant Lighting System.
Switchyard Components Commodity (Section 2.5.C.4)	Yes	
Switchyard System (Section 2.5.B.29)	Yes	Includes the following subsystems: • 115KV Switchyard (Scriba and NMP2) • 115KV Switchyard Substation (NMP2) • 115KV Switchyard Substation (Scriba) • 115KV Transmission Line • 345KV Switchyard • 345KV Switchyard Substation • 345KV Transmission Line • Main Transformer (Including Auxiliaries) • Station Protection Auxiliary Boiler Transformer • Station Protection Generator • Station Protection Main Transformer • Station Protection Normal Station Service Transformer • Station Protection Reserve Station Service Transformer • Station Protection Unit • Station Service Transformer Normal (Including Auxiliaries) • Synchronizing Main Generator • Synchronizing Station Service
Synchronizing – Diesel Generator (Section 2.5.B.30)	Yes	

TABLE 2.2-2
NMP2 PLANT LEVEL SCOPING RESULTS

Electrical Systems		
System or Commodity	**Within Scope of License Renewal?**	**Comments**
Unit Substation Emergency AC Controls and Heater Supply System (Section 2.5.B.31)	Yes	
Unit Substation Emergency System (Section 2.5.B.32)	Yes	
Unit Substation System (Section 2.5.B.33)	Yes	
UPS Distribution System (Section 2.5.B.34)	Yes	
Welding Power System	No	

TABLE 2.2-2
NMP2 PLANT LEVEL SCOPING RESULTS

Structures and Component Supports		
System, Structure, or Commodity	**Within Scope of License Renewal?**	**Comments**
Auxiliary Service Building (Section 2.4.B.3)	Yes	
Component Supports Commodity (Section 2.4.C.1)	Yes	
Containment Auxiliary Structure – Superstructure	No	
Control Room Building (Section 2.4.B.4)	Yes	
Cooling Tower – Superstructure	No	
Diesel Generator Building (Section 2.4.B.5)	Yes	
Essential Yard Structures (Section 2.4.B.6)	Yes	
Fire Stops and Seals Commodity (Section 2.4.C.2)	Yes	
Fuel Handling System (Section 2.4.B.7)	Yes	Includes the following subsystems: • Fuel Nuclear Refueling System • Fuel Nuclear Storage System • Material Handling Fuel Storage Area
Main Stack (Section 2.4.B.8)	Yes	
Material Handling System (Section 2.4.B.9)	Yes	Includes material handling equipment in the following areas: • Material Handling Miscellaneous Buildings • Material Handling Radwaste Building • Material Handling Turbine Area • Miscellaneous Cranes, Elevators, and Doors Systems • Reactor Building Cranes and Elevators
Miscellaneous Building – Superstructure	No	
Motor Operated Doors System (Section 2.4.B.10)	Yes	
Non-essential Yard Structures	No	
Primary Containment Structure (Section 2.4.B.1)	Yes	
Radwaste Building (Section 2.4.B.11)	Yes	
Reactor Building (Section 2.4.B.2)	Yes	Includes the following subsystems: • Fuel Nuclear Transfer System • Vents –Turbine and Reactor Building System
Screenwell Building (Section 2.4.B.12)	Yes	

TABLE 2.2-2
NMP2 PLANT LEVEL SCOPING RESULTS

Structures and Component Supports		
System, Structure, or Commodity	**Within Scope of License Renewal?**	**Comments**
Standby Gas Treatment Building (Section 2.4.B.13)	Yes	
Turbine Building (Section 2.4.B.14)	Yes	

2.3 SCOPING AND SCREENING RESULTS: MECHANICAL SYSTEMS

2.3.1 REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEMS

The NMP1 and NMP2 Reactor Vessel, Internals, and Reactor Coolant Systems are described in Sections 2.3.1.A and 2.3.1.B, respectively.

2.3.1.A NMP1 REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEMS

The NMP1 Reactor Vessel, Internals, and Reactor Coolant System are those systems designed to contain and support the nuclear fuel, contain the reactor coolant, and transfer the heat produced in the reactor to the steam and power conversion systems for the production of electricity. The following systems are included in this subsection:

- NMP1 Reactor Pressure Vessel (2.3.1.A.1)
- NMP1 Reactor Pressure Vessel Internals (2.3.1.A.2)
- NMP1 Reactor Pressure Vessel Instrumentation System (2.3.1.A.3)
- NMP1 Reactor Recirculation System (2.3.1.A.4)
- NMP1 Control Rod Drive System (2.3.1.A.5)
- NMP1 Reactor Coolant Pressure Boundary Components in other Systems (2.3.1.A.6)

2.3.1.A.1 NMP1 REACTOR PRESSURE VESSEL

System Description

The NMP1 Reactor Pressure Vessel (RPV) contains and supports the reactor core, reactor internals, and the reactor coolant/moderator. The RPV forms part of the reactor coolant pressure boundary and serves as a barrier against leakage of radioactive materials to the drywell.

The RPV is a vertical, cylindrical pressure vessel with hemispherical heads. The cylindrical shell and hemispherical heads are fabricated from low alloy carbon steel that is clad on the interior with weld overlay. The top head is secured to the vessel with studs and nuts and includes two concentric seal-rings in the vessel head flange area to prevent reactor coolant leakage. The top head also includes nine safety valves that prevent overpressurization of the RPV. The vessel shell and bottom head include penetration nozzles for the various systems that comprise the reactor coolant pressure boundary, including control rod drive housing and in-core instrumentation thimbles. The RPV is supported by a steel skirt welded to the bottom head. The base of the skirt is continuously supported by a ring girder and sole plate fastened to a concrete foundation, which carries the load to the reactor building foundation slab.

This system is in scope for license renewal for the following reason:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

RPV components subject to AMR include all of the components extending from the support skirt (lowest elevation) to the safety valves located on the top head (highest elevation), and outboard to (and including) the nozzle safe ends.

USAR Reference(s)

More information about the RPV can be found in USAR Sections I.A.4, V.B.2, and XVI.A.

License Renewal Drawings

Refer to USAR Figures IV-9, V-2, and V-3.

Components Subject to an AMR

The component types requiring an AMR for the RPV and their intended functions are shown in Table 2.3.1.A.1-1. The AMR results for these component types are provided in Table 3.1.2.A-1.

Table 2.3.1.A.1-1
NMP1 Reactor Pressure Vessel

Component Type	Intended Functions
Bottom Head	Pressure Boundary, Structural/Functional Support
Nozzles	Pressure Boundary
Nozzle Safe Ends	Pressure Boundary
Penetrations: • Core Differential Pressure • CRD Stub Tube • Flux Monitor • Instrumentation • Vessel Drain	Pressure Boundary
Support Skirt and Attachment Welds	Structural/Functional Support
Thermal Sleeves	Pressure Boundary
	Pressure Boundary, Thermal Shielding
	Thermal Shielding
Top Head	Pressure Boundary
Top Head (Closure Studs and Nuts)	Pressure Boundary
Top Head (Flanges)	Pressure Boundary
Top Head (Leak Detection Lines)	Pressure Boundary
Top Head (Nozzles)	Pressure Boundary
Valves	Pressure Boundary
Vessel Shell (Flange)	Pressure Boundary
Vessel Shells • Beltline • Lower Shell • Upper Nozzle Shell • Upper RPV Shell	Pressure Boundary, Structural/Functional Support
Vessel Shell Welds (including attachment welds)	Pressure Boundary, Structural/Functional Support
	Structural/Functional Support

2.3.1.A.2 NMP1 REACTOR PRESSURE VESSEL INTERNALS

System Description

The NMP1 Reactor Pressure Vessel Internals provide support for the core and other internal components, maintain fuel configuration (coolable geometry) during normal operation and accident conditions, and provide reactor coolant flow distribution through the core.

The Reactor Pressure Vessel Internals consist of the components internal to the RPV. The main components are the reactor core (fuel, channels, control rods and instrumentation), core shroud (including the shroud support), core shroud stabilizers (shroud repair brackets and tie-rod assemblies), core support, top grid, control rod guide tubes, feedwater sparger, core spray spargers, liquid poison sparger and steam separator and dryer. All of the vessel internals, except the shroud support and springs in the fuel assemblies, are fabricated from stainless steel. The shroud support is fabricated from solid Inconel. The shroud support essentially sustains all of the vertical weight of the core structure (except the fuel assembly weights transmitted to the guide tube) and the steam separator assembly. Each guide tube, with its fuel support casting, bears the weight of four fuel assemblies and rests on a control rod drive housing welded to the stub tube mounted on the vessel bottom head.

This system is in scope for license renewal for the following reason:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

Reactor Pressure Vessel Internals components subject to AMR are located inside the RPV and extend from the bottom head to the top guide (excluding the fuel assemblies and control rods). Additionally, the steam dryer assembly is subject to an AMR.

USAR Reference(s)

More information about the Reactor Pressure Vessel Internals can be found in USAR Sections IV.B.7 and XVI.A.2.7.

License Renewal Drawings

Refer to USAR Figure IV-9.

Components Subject to an AMR

The component types requiring an AMR for the Reactor Pressure Vessel Internals and their intended functions are shown in Table 2.3.1.A.2-1. The AMR results for these component types are provided in Table 3.1.2.A-2.

Table 2.3.1.A.2-1
NMP1 Reactor Pressure Vessel Internals

Component Type	Intended Functions
CRD Assemblies (includes drive mechanism and housing)	Pressure Boundary, Structural/Functional Support
Control Rod Guide Tubes	Structural/Functional Support
Core Plates and Bolts	Structural/Functional Support
Core Shroud	Direct Flow, Structural/Functional Support
Core Shroud Head Bolts and Collars	Structural/Functional Support
Core Shroud Support Structures • Clamps • Core Plate Spacers • Support Plates • Support Rings • Support Welds • Tie Rod Assemblies	Structural/Functional Support
Core Spray Lines and Spargers	Direct Flow
	Structural/Functional Support
Incore Instrumentation Dry Tubes and Guide Tubes	Pressure Boundary
Orificed Fuel Supports	Direct Flow, Structural/Functional Support
Steam Dryer	NSR Functional Support
Top Guide	Structural/Functional Support

2.3.1.A.3 NMP1 REACTOR PRESSURE VESSEL INSTRUMENTATION SYSTEM

System Description

The NMP1 Reactor Pressure Vessel Instrumentation System provides a means of monitoring and transmitting information concerning key reactor vessel operating parameters during normal and emergency operations. Instrumentation is installed to monitor reactor parameters and indicate these on meters, chart recorders and hydraulic indicator units located in the control room, remote shutdown panels and instrument rooms. The parameters monitored are reactor vessel temperature, water level and pressure, core differential pressure, core spray sparger break (differential pressure), vessel head flange leakage and reactor safety valve position. This system also provides control signals to various systems which, in turn, initiate the appropriate actions required if the monitored parameter exceeds its desired setpoint. Systems receiving control signals from the Reactor Pressure Vessel Instrumentation System include the Reactor Protection, Automatic Depressurization, Anticipated Transient without Scram, Feedwater/HPCI, and Shutdown Cooling Systems.

The Reactor Pressure Vessel Instrumentation System consists of piping, valves, and excess flow check valves that provide a fluid path from the RPV to various instrumentation.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

The portion of the Reactor Pressure Vessel Instrumentation System containing components subject to AMR begins immediately outboard of the reactor vessel penetration or nozzle, and ends at the first isolation valve (inclusive) at the connection to piping leading to the reactor building equipment drain tank. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Reactor Building.

USAR Reference(s)

More information about the Reactor Pressure Vessel Instrumentation can be found in USAR Section VIII.C.2.1.

License Renewal Drawings

Components requiring an AMR for the Reactor Pressure Vessel Instrumentation System are highlighted on the following drawings:

- LR-18015-C, Revision 0, Reactor Vessel Instrumentation P&ID
- LR-18016-C, Sheet 1, Revision 0, Control Rod Drive P&ID
- LR-18016-C, Sheet 3, Revision 0, Reactor Vessel Water Level Reference Leg Backfill P&ID
- LR-18041-C, Sheet 7, Revision 0, Sampling Points Reactor Vessel Post Accident P&ID
- LR-69015-C, Sheet 1, Revision 0, Reactor Vessel Level, East Inst. Room El. 284'-0", Instrument Diagram
- LR-69015-C, Sheet 2, Revision 0, Reactor Vessel Level, West Inst. Room R.B. El. 284'-0", Instrument Diagram
- LR-69015-C, Sheet 3, Revision 0, Reactor Vessel Level, (Wide Range) & Pressure, West Inst. Room R.B. El. 284'-0"
- LR-69017-C, Sheet 2, Revision 0, Emergency Condenser #11 Steam Flow, East Instrumentation Room, El. 284'-0" Reactor Building
- LR-69017-C, Sheet 3, Revision 0, Emergency Condenser #12 Steam Flow, West Instrumentation Room, El. 284'-0" Reactor Building
- LR-F69015C, Sheet 4, Revision 0, RV Level & Pressure West Inst. Room Instrument Diagram
- LR-F69015C, Sheet 5, Revision 0, RV Level & Pressure East Inst. Room Instrument Diagram
- LR-F69015C, Sheet 6, Revision 0, RV Level and Core dP Lower Inst. Room Instrument Diagram

Components Subject to an AMR

The component types requiring an AMR for the Reactor Pressure Vessel Instrumentation System and their intended functions are shown in Table 2.3.1.A.3-1. The AMR results for these component types are provided in Table 3.1.2.A-3.

Table 2.3.1.A.3-1
NMP1 Reactor Pressure Vessel Instrumentation System

Component Type	Intended Functions
Closure Bolting	Pressure Boundary
Condensing Pots	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Temperature Equalizing Columns	Pressure Boundary
Valves	Pressure Boundary

2.3.1.A.4 NMP1 REACTOR RECIRCULATION SYSTEM

System Description

The NMP1 Reactor Recirculation System is designed to provide a variable reactor coolant flow in order to control reactor power levels.

The Reactor Recirculation System is part of the reactor coolant pressure boundary and consists of five, external loops. Each loop draws suction from the downcomer annulus region of the RPV and discharges reactor coolant to the RPV lower plenum. Each loop consists of a variable speed pump, blocking valves, bypass line and associated instrumentation. The reactor recirculation pumps are controlled by separate variable frequency motor-generator sets, each having associated controls and instrumentation. Other systems that connect directly to the Reactor Recirculation System piping are the Emergency Cooling System, Shutdown Cooling System, Reactor Water Cleanup System and the Sampling System.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function(s) per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

The portion of the Reactor Recirculation System containing components subject to AMR includes the entire main Reactor Recirculation flow path, which begins at the suction nozzle to, and ends at the discharge nozzle of, each recirculation loop. Safety-related instrumentation piping and associated components connected to the recirculation loops are also subject to AMR. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Reactor Building.

USAR Reference(s)

More information about the Reactor Recirculation System can be found in USAR Sections V.B.3 and XVI.D.2.1.

License Renewal Drawings

Components requiring an AMR for the Reactor Recirculation System are highlighted on the following drawings:

- LR-18006-C, Sheet 1, Revision 0, Drywell & Torus, Isolation Valves P&ID
- LR-18020-C, Revision 0, Reactor Recirculation Loops
- LR-69020-C, Sheet 1, Revision 0, Reactor Recirc. Loop #11 Recirc. Flow, Instrument Room R.B. El. 237'-0", Instrument Diagram
- LR-69020-C, Sheet 2, Revision 0, Reactor Recirc. Loop #12 Recirc. Flow, Instrument Room R.B. El. 237'-0", Instrument Diagram
- LR-69020-C, Sheet 3, Revision 0, Reactor Recirc. Loop #13 Recirc. Flow, Instrument Room R.B. El. 237'-0", Instrument Diagram

- LR-69020-C, Sheet 4, Revision 0, Reactor Recirc. Loop #14 Recirc. Flow, Instrument Room R.B. El. 237'-0", Instrument Diagram
- LR-69020-C, Sheet 5, Revision 0, Reactor Recirc. Loop #15 Recirc. Flow, Instrument Room R.B. El. 237'-0", Instrument Diagram
- LR-69020-C, Sheet 6, Revision 0, Reactor Recirc. Pump #11 Seal Press, Lower Inst. Room R.B. El. 237', Instrument Diagram
- LR-69020-C, Sheet 7, Revision 0, Reactor Recirc. Pump #12 Seal Press, Lower Inst. Room R.B. El. 237', Instrument Diagram
- LR-69020-C, Sheet 8, Revision 0, Reactor Recirc. Pump #13 Seal Press, Lower Inst. Room R.B. El. 237', Instrument Diagram
- LR-69020-C, Sheet 9, Revision 0, Reactor Recirc. Pump #14 Seal Press, Lower Inst. Room R.B. El. 237', Instrument Diagram
- LR-69020-C, Sheet 10, Revision 0, Reactor Recirc. Pump #15 Seal Press, Lower Inst. Room R.B. El. 237', Instrument Diagram
- LR-69020-C, Sheet 11, Revision 0, Rx Recirc. Loop #11 Pump Diff. Press, Instrument Room R.B. El. 237'-0", Instrument Diagram
- LR-69020-C, Sheet 12, Revision 0, Rx Recirc. Loop #12 Pump Diff. Press, Instrument Room R.B. El. 237'-0", Instrument Diagram
- LR-69020-C, Sheet 13, Revision 0, Rx Recirc. Loop #13 Pump Diff. Press, Instrument Room R.B. El. 237'-0", Instrument Diagram
- LR-69020-C, Sheet 14, Revision 0, Rx Recirc. Loop #14 Pump Diff. Press, Instrument Room R.B. El. 237'-0", Instrument Diagram
- LR-69020-C, Sheet 15, Revision 0, Rx Recirc. Loop #15 Pump Diff. Press, Instrument Room R.B. El. 237'-0", Instrument Diagram

Components Subject to an AMR

The component types requiring an AMR for the Reactor Recirculation System and their intended functions are shown in Table 2.3.1.A.4-1. The AMR results for these component types are provided in Table 3.1.2.A-4.

Table 2.3.1.A.4-1
NMP1 Reactor Recirculation System

Component Type	Intended Functions
Closure Bolting	Pressure Boundary
Flow Elements	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Pump Seal Flanges	Pressure Boundary
Valves	Pressure Boundary

2.3.1.A.5 NMP1 CONTROL ROD DRIVE SYSTEM

System Description

The NMP1 Control Rod Drive (CRD) System is designed to change core reactivity by changing the position of control rods within the reactor core in response to manual control signals and to scram the reactor in response to manual or automatic signals. The system also provides high-pressure makeup to the RPV for a specified leakage of 25 gpm and to provide core cooling in the case of a small line break (up to 0.003 ft^3). The Control Rod Drive System also provides water to the reactor vessel level instrumentation reference leg backfill system and to the keep-full system for the Emergency Cooling System.

The Control Rod Drive System consists of two redundant pumps, filters, strainers, control valves, hydraulic control units, control rod drive mechanisms, scram discharge volume, isolation valves and associated piping, valves, controls and instrumentation. The normal water supply for the pumps is the Condensate System with backup supplies available from the condensate storage tanks and the demineralized water storage tank. The discharge of each pump provides water directly to the reactor level instrumentation reference leg backfill system, Emergency Cooling Keep-Full System and the control rod drive water filters. Downstream of the filters, through pressure and flow control valves, cooling water is provided to the control rod drive mechanisms, charging water is provided to the hydraulic control units, drive water is provided to the directional control valves, and the remaining water is provided directly to the RPV. Following a reactor scram, the exhaust water from the control rod drive mechanisms is collected in the scram discharge volume.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), and anticipated transients without scram (10 CFR 50.62).

The portion of the CRD System containing components subject to AMR extends from the CRDs, to the piping for the hydraulic control units, and the isolation or check valves defining the safety related boundary. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Reactor Building.

USAR Reference(s)

More information about the CRD System can be found in USAR Sections IV.B.6 and X.C.

License Renewal Drawings

Components requiring an AMR for the CRD System are highlighted on the following drawings:

- LR-18016-C, Sheet 1, Revision 0, Control Rod Drive P&ID
- LR-18016-C, Sheet 2, Revision 0, Control Rod Drive, Scram Dump Volume P&ID
- LR-18017-C, Sheet 1, Revision 0, Emergency Cooling System
- LR-45136-C, Sheet 1, Revision 0, Instrumentation, Valve Schedule
- LR-45136-C, Sheet 3A, Revision 0, Instrumentation, Valve Schedule

Components Subject to an AMR

The component types requiring an AMR for the CRD System and their intended functions are shown in Table 2.3.1.A.5-1. The AMR results for these component types are provided in Table 3.1.2.A-5.

Table 2.3.1.A.5-1
NMP1 Control Rod Drive System

Component Type	Intended Functions
Accumulators	Pressure Boundary
Filters	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Valves	Pressure Boundary

2.3.1.A.6 NMP1 REACTOR COOLANT PRESSURE BOUNDARY COMPONENTS IN OTHER SYSTEMS

In addition to the systems and components described in preceding subsections, reactor coolant pressure boundary components included with other plant systems are evaluated in NUREG-1801 as part of the reactor vessel, internals and reactor coolant system. In Section 2.3, the components requiring aging management review that have reactor coolant pressure boundary functions have been maintained in the plant system to which they are normally assigned, rather than grouped with other reactor coolant pressure boundary components in the reactor vessel, internals and reactor coolant system. Table 2.3.1.A.6-1 presents a list of plant systems having reactor coolant pressure boundary components evaluated in NUREG-1801 as part of the reactor vessel, internals and reactor coolant system.

For each of these systems, applicable system descriptions, USAR references, license renewal boundary diagram references, system intended functions, and complete listings of component groups requiring aging management review are presented in the application section indicated in Table 2.3.1.A.6-1. Aging management review results for these reactor coolant pressure boundary components are presented in their respective sections.

Table 2.3.1.A.6-1
NMP1 Application Sections Where Additional Reactor Coolant Pressure Boundary Components Are Evaluated

System Name	Other Application Section that Contain Reactor Coolant Pressure Boundary Components
NMP1 Core Spray System	Section 2.3.2.A.3
NMP1 Emergency Cooling System	Section 2.3.2.A.4
NMP1 Feedwater/High Pressure Coolant Injection System	Section 2.3.4.A.3
NMP1 Liquid Poison System	Section 2.3.3.A.11
NMP1 Main Steam System	Section 2.3.4.A.5
NMP1 Reactor Water Cleanup System	Section 2.3.3.A.19
NMP1 Sampling System	Section 2.3.3.A.20
NMP1 Shutdown Cooling System	Section 2.3.3.A.22

2.3.1.B NMP2 REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEMS

The NMP2 Reactor Vessel, Internals, and Reactor Coolant Systems are those systems designed to contain and support the nuclear fuel, contain the reactor coolant, and transfer the heat produced in the reactor to the steam and power conversion systems for the production of electricity. The following systems are included in this subsection:

- NMP2 Reactor Pressure Vessel (2.3.1.B.1)
- NMP2 Reactor Pressure Vessel Internals (2.3.1.B.2)
- NMP2 Reactor Pressure Vessel Instrumentation System (2.3.1.B.3)
- NMP2 Reactor Recirculation System (2.3.1.B.4)
- NMP2 Control Rod Drive System (2.3.1.B.5)
- NMP2 Reactor Coolant Pressure Boundary Components in Other Systems (2.3.1.B.6)

2.3.1.B.1 NMP2 REACTOR PRESSURE VESSEL

System Description

The NMP2 RPV contains and supports the reactor core, reactor internals, and the reactor coolant/moderator. The RPV forms part of the reactor coolant pressure boundary and serves as a barrier against leakage of radioactive materials to the drywell.

The NMP2 RPV is a vertical cylindrical pressure vessel of welded construction with hemispherical bottom and top heads. The cylindrical shell and top and bottom heads of the RPV are fabricated of low-alloy steel, the interior of which is clad with stainless steel weld overlay, except for the top head and nozzle and nozzle weld zones. The RPV top head is secured to the RPV by studs and nuts. The RPV flanges are sealed with two concentric metal seal rings designed to permit no detectable leakage through the inner or outer seal at any operating condition. The RPV is penetrated by various nozzles and penetrations. The CRD housings and in-core instrumentation thimbles are welded to the bottom head of the RPV. The concrete and steel vessel support pedestal is constructed as an integral part of the building foundation. Steel anchor bolts, set in the concrete, extend through the bearing plate and secure the flange of the reactor vessel support skirt to the bearing plate, and thus to the support pedestal.

This system is in scope for license renewal for the following reason:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

RPV components subject to AMR include all of the components extending from the support skirt (lowest elevation) to the top head (highest elevation), and outboard to (and including) the nozzle safe ends.

USAR Reference(s)

More information about the RPV can be found in USAR Section 5.3.

License Renewal Drawings

Refer to USAR Figure 5.3-4.

Components Subject to an AMR

The component types requiring an AMR for the RPV and their intended functions are shown in Table 2.3.1.B.1-1. The AMR results for these component types are provided in Table 3.1.2.B-1.

Table 2.3.1.B.1-1
NMP2 Reactor Pressure Vessel

Component Type	Intended Functions
Bottom Head	Pressure Boundary, Structural/Functional Support
Nozzles	Pressure Boundary
Nozzle Safe Ends	Pressure Boundary
Nozzle Thermal Sleeves	Pressure Boundary
Penetrations: • Core Differential Pressure and Liquid Control • CRD Stub Tubes • Drain Lines • Incore Instruments • Instrumentation	Pressure Boundary
Support Skirt	Structural/Functional Support
Top Head and Nozzles	Pressure Boundary
Top Head (Closure Studs and Nuts)	Pressure Boundary
Top Head (Flanges)	Pressure Boundary
Top Head (Leak Detection Lines)	Pressure Boundary
Vessel Shells (Flange)	Pressure Boundary, Structural/Functional Support
Vessel Shells • Lower Intermediate Shell • Lower Shell • Upper Intermediate Shell • Upper Shell	Pressure Boundary, Structural/Functional Support
Vessel Welds (including attachment welds)	Pressure Boundary
	Pressure Boundary, Structural/Functional Support
	Structural/Functional Support

2.3.1.B.2 NMP2 REACTOR PRESSURE VESSEL INTERNALS

System Description

The NMP2 Reactor Pressure Vessel Internals provide support for the core and other internal components, maintain fuel configuration (coolable geometry) during normal operation and accident conditions, and provide reactor coolant flow distribution through the core.

The NMP2 Reactor Pressure Vessel Internals consists of the components internal to the RPV. The main structures within the RPV are the core (fuel, channels, control rods and instrumentation), the core support structure (including the shroud, top guide and core plate), the shroud head and steam separator assembly, the steam dryer assembly, the feedwater spargers, the core spray spargers, and the jet pumps. Except for the Zircaloy used in the fuel assemblies, reactor internals are stainless steel or other corrosion-resistant alloys. The fuel assemblies (which include fuel rods and channel), control rods, in-core instrumentation, shroud head and steam separator assembly, and steam dryers are removable when the reactor vessel is opened for refueling or maintenance.

This system is in scope for license renewal for the following reason:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

Reactor Pressure Vessel Internals components subject to AMR are located inside the RPV and extend from the bottom head to the top guide (excluding the fuel assemblies and control rods). Additionally, the steam dryer assembly is subject to an AMR.

USAR Reference(s)

More information about the Reactor Pressure Vessel Internals can be found in USAR Sections 4.1.2 and 3.9B.5.

License Renewal Drawings

Refer to USAR Figure 5.3-4.

Components Subject to an AMR

The component types requiring an AMR for the Reactor Pressure Vessel Internals and their intended functions are shown in Table 2.3.1.B.2-1. The AMR results for these component types are provided in Table 3.1.2.B-2.

Table 2.3.1.B.2-1
NMP2 Reactor Pressure Vessel Internals

Component Type	Intended Functions
Access Hole Covers	Pressure Boundary
CRD Assemblies (includes drive mechanism and housing)	Pressure Boundary, Structural/Functional Support
Control Rod Guide Tubes	Pressure Boundary, Structural/Functional Support
Core Plate, Bolts, and Supports	Structural/Functional Support
Core Shroud	Direct Flow, Structural/Functional Support
Core Shroud Head Bolts	Structural/Functional Support
Core Shroud Support Structures • Bolts • Brackets • Cap Screws • Clamps • Keepers • Supports	Structural/Functional Support
Core Spray Lines and Spargers	Direct Flow, Pressure Boundary
	Pressure Boundary
Differential Pressure Liquid Control Line	Pressure Boundary
Flanges	Structural/Functional Support
Incore Housings	Pressure Boundary, Structural/Functional Support
Incore Instrumentation Dry Tubes	Pressure Boundary
Jet Pump Assemblies	Direct Flow
	Structural/Functional Support
	Thermal Shielding
LPCI Couplings	Direct Flow, Pressure Boundary
Orificed Fuel Supports	Direct Flow, Structural/Functional Support
Peripheral Fuel Supports	Structural/Functional Support
Power Range Detector Assemblies	Pressure Boundary
Spray Nozzles	Direct Flow, Pressure Boundary
Steam Dryer	NSR Functional Support
Top Guide and Supports	Structural/Functional Support

2.3.1.B.3 NMP2 REACTOR PRESSURE VESSEL INSTRUMENTATION SYSTEM

System Description

The NMP2 Reactor Pressure Vessel Instrumentation System provides a means of monitoring and transmitting information concerning key reactor vessel operating parameters during normal and emergency operations. Instrumentation is installed to monitor reactor parameters and indicate these on meters and chart recorders in the control room and remote shutdown panels. The parameters monitored are reactor vessel temperature, water level and pressure, core flow, core plate differential pressure and vessel flange seal leakage. This system also provides control signals to various systems which, in turn, initiate the appropriate actions required if the monitored parameter exceeds its desired setpoint. Systems receiving control signals from the Reactor Pressure Vessel Instrumentation System include Reactor Protection, Primary Containment Isolation, Automatic Depressurization, Feedwater Control, Reactor Recirculation Flow Control, Redundant Reactivity Control and Residual Heat Removal (Shutdown Cooling mode) systems.

The Reactor Pressure Vessel Instrumentation System consists of piping, valves and restricting orifices that provide a fluid path from the RPV to various instrumentation.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

The portion of the Reactor Pressure Vessel Instrumentation System containing components subject to AMR begins immediately outboard of the reactor vessel instrumentation nozzles, and ends at connections to other systems such as High Pressure Core Spray (Section 2.3.2.B.3) and Control Rod Drive (Section 2.3.1.B.5).

USAR Reference(s)

More information about the Reactor Pressure Vessel Instrumentation System can be found in USAR Sections 4.4.6 and 5.1.

License Renewal Drawings

Components requiring an AMR for the Reactor Pressure Vessel Instrumentation System are highlighted on the following drawings:

- LR-028, Sheet A, Revision 0, Nuclear Boiler and Process Instrumentation P&ID
- LR-028, Sheet B, Revision 0, Nuclear Boiler and Process Instrumentation P&ID
- LR-028, Sheet C, Revision 0, Nuclear Boiler and Process Instrumentation P&ID

Components Subject to an AMR

The component types requiring an AMR for the Reactor Pressure Vessel Instrumentation System and their intended functions are shown in Table 2.3.1.B.3-1. The AMR results for these component types are provided in Table 3.1.2.B-3.

Table 2.3.1.B.3-1
NMP2 Reactor Pressure Vessel Instrumentation System

Component Type	Intended Functions
Closure Bolting	Pressure Boundary
Condensing Chambers	Pressure Boundary
Piping and Fittings	NSR Functional Support
	Pressure Boundary
Radiation Collars	Radiation Shielding
Restriction Orifices	Pressure Boundary
Vacuum Breakers	Pressure Boundary
Valves	Pressure Boundary

2.3.1.B.4 NMP2 REACTOR RECIRCULATION SYSTEM

System Description

The NMP2 Reactor Recirculation System is designed to provide a variable reactor coolant flow in order to control reactor power levels.

The NMP2 Reactor Recirculation System is part of the reactor coolant pressure boundary and consists of two external loops. Each loop contains a pump, flow control valve, two blocking valves, piping and associated controls and instrumentation. Coolant flow is from the RPV annulus region, through a recirculation pump and flow control valve, into an external manifold from which individual recirculation inlet lines are routed to the jet pump risers within the RPV. The jet pumps are evaluated as part of the Reactor Pressure Vessel Internals. The recirculation pumps operate at two speeds with power coming from either the low frequency motor generator set (25 percent) or a 60-Hz power source (100 percent). The flow control valves are controlled by two separate sets of control system components, one for each valve.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

The portion of the Reactor Recirculation system containing components subject to AMR includes the entire main Reactor Recirculation flow path, which begins at the suction nozzle to, and ends at the discharge manifold nozzles to the jet pump risers of, each recirculation loop. Safety-related instrumentation piping and associated components connected to the recirculation loops are also subject to AMR. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Primary Containment Structure and Reactor Building (secondary containment).

USAR Reference(s)

More information about the Reactor Recirculation System can be found in USAR Sections 5.4.1 and 7.7.1.2.

License Renewal Drawings

Components requiring an AMR for the Reactor Recirculation System are highlighted on the following drawings:

- LR-029, Sheet A, Revision 0, Reactor Recirculation System P&ID
- LR-029, Sheet B, Revision 0, Reactor Recirculation System P&ID
- LR-029, Sheet C, Revision 0, Reactor Recirculation System P&ID
- LR-031, Sheet A, Revision 0, Residual Heat Removal System P&ID

Components Subject to an AMR

The component types requiring an AMR for the Reactor Recirculation System and their intended functions are shown in Table 2.3.1.B.4-1. The AMR results for these component types are provided in Table 3.1.2.B-4.

Table 2.3.1.B.4-1
NMP2 Reactor Recirculation System

Component Type	Intended Functions
Closure Bolting	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Radiation Collars	Radiation Shielding
Restriction Orifices	Flow Restriction, Pressure Boundary
Seal Coolers	Heat Transfer, Pressure Boundary
Valves	Pressure Boundary

2.3.1.B.5 NMP2 CONTROL ROD DRIVE SYSTEM

System Description

The NMP2 Control Rod Drive System is designed to change core reactivity by changing the position of control rods within the reactor core in response to manual control signals and to scram the reactor in response to manual or automatic signals. The system also provides water to the nuclear boiler instrumentation system reference leg backfill injection lines and the Reactor Water Cleanup and Reactor Recirculation pump seals.

The Control Rod Drive System consists of two redundant pumps, filters, control valves, hydraulic control units, control rod drive mechanisms, scram discharge volume and associated piping, valves, controls and instrumentation. The normal water supply for the pumps is the Condensate System with a backup supply from the condensate storage tank. The discharge of each pump provides water to the nuclear boiler instrumentation system reference leg backfill injection lines, Reactor Water Cleanup and Reactor Recirculation pump seals and through filters and pressure and control valves to several portions of the system. These portions are cooling water to the control rod drive mechanisms, charging water to the hydraulic control units and drive water to the directional control valves. Following a reactor scram, the exhaust water from the control rod drive mechanisms is collected in the scram discharge volume.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

The portion of the CRD System containing components subject to AMR begins at the supply connection with the Condensate Makeup and Drawoff System [see Condensate System (Section 2.3.4.B.2)], continues through the pump suction piping and pump discharge piping, and through the CRDs. Branch piping supplying the Reactor Water Cleanup pump seals and Reactor Recirculation pump seals, and Reactor Pressure Vessel Instrumentation System (Section 2.3.1.B.3), also contains components subject to AMR. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Reactor Building (secondary containment).

USAR Reference(s)

More information about the CRD System can be found in USAR Section 4.6.1.

License Renewal Drawings

Components requiring an AMR for the CRD System are highlighted on the following drawings:

- LR-004, Sheet, A, Revision 0, Condensate Storage and Transfer P&ID
- LR-028, Sheet A, Revision 0, Nuclear Boiler and Process Instrumentation P&ID
- LR-030, Sheet A, Revision 0, Control Rod Drive Hydraulic System P&ID
- LR-030, Sheet B, Revision 0, Control Rod Drive Hydraulic System P&ID
- LR-030, Sheet C, Revision 0, Control Rod Drive Hydraulic System P&ID

Components Subject to an AMR

The component types requiring an AMR for the CRD System and their intended functions are shown in Table 2.3.1.B.5-1. The AMR results for these component types are provided in Table 3.1.2.B-5.

Table 2.3.1.B.5-1
NMP2 Control Rod Drive System

Component Type	Intended Functions
Accumulators	Pressure Boundary
CRD Hydraulic Control Units	Pressure Boundary
Filters	Pressure Boundary
Flow Elements	Pressure Boundary
Flow Indicators	Pressure Boundary
Flow Orifices	Flow Restriction, Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Rupture Discs	Pressure Boundary
Valves	Pressure Boundary

2.3.1.B.6 NMP2 REACTOR COOLANT PRESSURE BOUNDARY COMPONENTS IN OTHER SYSTEMS

In addition to the systems and components described in preceding subsections, reactor coolant pressure boundary components included with other plant systems are evaluated in NUREG-1801 as part of the reactor vessel, internals and reactor coolant system. In Section 2.3, the components requiring aging management review that have reactor coolant pressure boundary functions have been maintained in the plant system to which they are normally assigned, rather than grouped with other reactor coolant pressure boundary components in the reactor vessel, internals and reactor coolant system. Table 2.3.1.B.6-1 presents a list of plant systems having reactor coolant pressure boundary components evaluated in NUREG-1801 as part of the reactor vessel, internals and reactor coolant system.

For each of these systems, applicable system descriptions, USAR references, license renewal boundary diagram references, system intended functions, and complete listings of component groups requiring aging management review are presented in the application section indicated in Table 2.3.1.B.6-1. Aging management review results for these reactor coolant pressure boundary components are presented in their respective sections.

Table 2.3.1.B.6-1
NMP2 Application Sections Where Additional Reactor Coolant Pressure Boundary Components Are Evaluated Boundary Components Are Evaluated

System Name	Other Application Sections That Contain Reactor Coolant Pressure Boundary Components
NMP2 Feedwater System	Section 2.3.4.B.3
NMP2 Floor and Equipment Drains System	Section 2.3.3.B.14
NMP2 High-Pressure Core Spray System	Section 2.3.2.B.3
NMP2 Low-Pressure Core Spray System	Section 2.3.2.B.4
NMP2 Main Steam System	Section 2.3.4.B.4
NMP2 Reactor Core Isolation Cooling System	Section 2.3.2.B.6
NMP2 Reactor Water Cleanup System	Section 2.3.3.B.25
NMP2 Residual Heat Removal System	Section 2.3.2.B.7
NMP2 Standby Liquid Control System	Section 2.3.3.B.31

2.3.2 ENGINEERED SAFETY FEATURES SYSTEMS

The NMP1 and NMP2 Engineered Safety Features (ESF) Systems are described in Sections 2.3.2.A and 2.3.2.B, respectively.

2.3.2.A NMP1 ENGINEERED SAFETY FEATURES SYSTEMS

NMP1 ESF Systems consist of systems and components designed to function under accident conditions to minimize the severity of an accident or to mitigate the consequences of an accident. In the event of a Loss-of-Coolant Accident (LOCA), the ESF Systems provide emergency coolant to assure structural integrity of the core, to maintain the integrity of the containment, or to reduce the concentration of fission products expelled to the Reactor Building atmosphere. The following systems are included in this subsection:

- NMP1 Automatic Depressurization System (Section 2.3.2.A.1)
- NMP1 Containment Spray System (Section 2.3.2.A.2)
- NMP1 Core Spray System (Section 2.3.2.A.3)
- NMP1 Emergency Cooling System (Section 2.3.2.A.4)

Note: NUREG-1801 also lists the High Pressure Coolant Injection (HPCI) System in the Emergency Core Cooling System Section (V.D). The NMP1 USAR Section VII.I.1 states that the HPCI System is not an ESF System and that the HPCI System is an operating mode of the Feedwater System. Further information about the HPCI System can be found in the Feedwater/High Pressure Coolant Injection (FW/HPCI) System (Section 2.3.4.A.3). Additionally, the USAR lists the Emergency Ventilation System, the Combustible Gas Control System, and the Liquid Poison System in the Engineering Safeguards Section (Sections VII.G, VII.H, and VII.C respectively). The Emergency Ventilation System is evaluated as part of the Reactor Building HVAC System (Section 2.3.3.A.18). The Combustible Gas Control System is evaluated as part of the Containment Systems (Section 2.3.3.A.5). The Liquid Poison is evaluated in (Section 2.3.3.A.11) as an Auxiliary System consistent with the characterization of Auxiliary Systems in NUREG-1801.

2.3.2.A.1 NMP1 AUTOMATIC DEPRESSURIZATION SYSTEM

System Description

The purpose of the NMP1 Automatic Depressurization System is to reduce Reactor Pressure Vessel (RPV) pressure for small line breaks when there is no feedwater flow. When RPV pressure is reduced to the low pressure permissive setpoint of the Core Spray System (Section 2.3.2.A.3), sufficient inventory makeup is available to maintain adequate core cooling.

The Automatic Depressurization System consists of six solenoid-operated relief valves that discharge to the torus. Three relief valves are located on each main steam line. The discharge piping also contains vacuum breakers. The Automatic Depressurization System instrumentation and controls are included within this system.

This system is in scope for license renewal for the following reason:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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) and environmental qualification (10 CFR 50.49).

USAR Reference(s)

More information about the Automatic Depressurization System can be found in USAR Sections VII.A.2 and X.10B.5.6.1.1.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

The component types subject to an AMR that perform the system intended functions for the Automatic Depressurization System are part of, and evaluated in, the Main Steam System (Section 2.3.4.A.5). No additional components within the Automatic Depressurization System are subject to aging management review.

2.3.2.A.2 NMP1 CONTAINMENT SPRAY SYSTEM

System Description

The purpose of the NMP1 Containment Spray System is to prevent containment pressure and temperature from exceeding its design values following loss of coolant accidents.

The Containment Spray System consists of two redundant loops that take suction from the torus and discharge to one of two drywell spargers and a torus sparger. Each loop consists of two redundant trains. Each train consists of a suction header, pump, heat exchanger, common test return line and associated piping and valves. The heat exchangers are cooled by a dedicated containment spray raw water pump that takes suction from the circulating water intake tunnel and discharges to the discharge tunnel. Each raw water train consists of a pump, strainer and associated piping and valves. The Containment Spray System instrumentation and controls are included within this system.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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) and environmental qualification (10 CFR 50.49).

The components subject to an AMR extend from the torus to the spray nozzles located inside containment and also include the raw water cooling system for the Containment Spray heat exchangers.

USAR Reference(s)

More information about the Containment Spray System can be found in USAR Section VII.B.

License Renewal Drawings

Components requiring an AMR for the Containment Spray System are highlighted on the following drawings:

- LR-18012-C, Sheet 1, Revision 0, Reactor Containment, Spray Raw Water System

- LR-18012-C, Sheet 2, Revision 0, Reactor Containment, Spray System
- LR-18022-C, Sheet 1, Revision 0, Service Water, Reactor & Turbine Bldgs.
- LR-69012-C, Sheet 3, Revision 0, Primary & Secondary Cont. Spray Press., Reactor Building 281'-0", Instrument Diagram
- LR-69012-C, Sheet 4, Revision 0, Containment Spray Pumps #111 & #121, Northwest Corner Reactor Build. El. 198'-0", Instrument Diagram
- LR-69012-C, Sheet 5, Revision 0, Containment Spray Pumps #112 & #122, Northeast Corner Reactor Build. El. 198'-0", Instrument Diagram

Components Subject to an AMR

The component types requiring an AMR for the Containment Spray System and their intended functions are shown in Table 2.3.2.A.2-1. The AMR results for these component types are provided in Table 3.2.2.A-1.

Table 2.3.2.A.2-1
NMP1 Containment Spray System

Component Type	Intended Functions
Bolting	Pressure Boundary
Filters/Strainers	Pressure Boundary
Flow Elements	Pressure Boundary
Flow Orifices	Flow Restriction, Pressure Boundary
	Pressure Boundary
Heat Exchangers	Heat Transfer, Pressure Boundary
Nozzles	Pressure Boundary
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Valves	Pressure Boundary

2.3.2.A.3 NMP1 CORE SPRAY SYSTEM

System Description

The purpose of the NMP1 Core Spray System is to prevent fuel damage following any postulated LOCA. For small line breaks, the Automatic Depressurization System (Section 2.3.2.A.1) is used in conjunction with the Core Spray System to prevent fuel damage.

The Core Spray System consists of two redundant loops that take suction from the torus and discharge to one of two spargers inside the RPV. Each loop consists of two redundant trains. Each train consists of a suction strainer, core spray pump, core spray topping (booster) pump, associated piping and valves and a common discharge header to the sparger. A test return line, high-point vents and keep full system are also provided for each loop. A seal water supply line originates from the topping pump discharge header in each core spray loop to pressurize and provide a supply of seal water to the Shutdown Cooling System (Section 2.3.3.A.22) isolation valves. Core Spray System instrumentation and controls are included within this system.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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) and environmental qualification (10 CFR 50.49).

The components subject to an AMR extend from the torus to the inlet nozzles on the RPV.

USAR Reference(s)

More information about the Core Spray System can be found in USAR Section VII.A.

License Renewal Drawings

Components requiring an AMR for the Core Spray System are highlighted on the following drawings:

- LR-69007C, Sheet 5, Revision 0, Core Spray Pump #121 & #122 Suction Press. Instrument Diagram

- LR-69007C, Sheet 6, Revision 0, Core Spray Pump #111 & #112 Suction Press. Instrument Diagram
- LR-18007-C, Sheet 1, Revision 0, Reactor Core Spray
- LR-18007-C, Sheet 2, Revision 0, Reactor Core Spray
- LR-18012-C, Sheet 1, Revision 0, Reactor Containment, Spray Raw Water System

Components Subject to an AMR

The component types requiring an AMR for the Core Spray System and their intended functions are shown in Table 2.3.2.A.3-1. The AMR results for these component types are provided in Table 3.2.2.A-2.

Table 2.3.2.A.3-1
NMP1 Core Spray System

Component Type	Intended Functions
Bolting	Pressure Boundary
Filters/Strainers	Pressure Boundary
Flow Elements	Pressure Boundary
Flow Orifices	Flow Restriction, Pressure Boundary
Heat Exchangers	Heat Transfer, Pressure Boundary
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Valves	Pressure Boundary

2.3.2.A.4 NMP1 EMERGENCY COOLING SYSTEM

System Description

The purpose of the NMP1 Emergency Cooling System is to remove decay heat from the RPV fuel in the event that RPV feedwater capability is lost and the main condenser is not available. This system serves as an alternate heat sink when the RPV is isolated from its normal heat sink (i.e., the main condenser).

The Emergency Cooling System consists of two redundant loops connected to the RPV on the steam supply side and to the Reactor Recirculation System on the condensate return side. Each loop consists of two condensers (heat exchangers), a makeup water storage tank, a keep full system and associated piping and valves. Steam side vents are connected to each loop that removes non-condensable gases to the main steam lines or torus (for accident conditions). Drain lines are also provided on each loop’s steam lines. Emergency Cooling System instrumentation and controls are included within this system.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), and station blackout (10 CFR 50.63).

The components subject to an AMR extend from the system connections with the Reactor Vessel to the system connections with the Reactor Recirculation System. Included are the system piping, fittings, valves, emergency condensers, makeup tanks, vents, and drains. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Reactor Building and Turbine Building.

USAR Reference(s)

More information about the Emergency Cooling System can be found in USAR Section V.E.

License Renewal Drawings

Components requiring an AMR for the Emergency Cooling System are highlighted on the following drawings:

- LR-18017-C, Sheet 1, Revision 0, Emergency Cooling System
- LR-18048-C, Revision 0, Condensate Transfer System, Pump Discharge

Components Subject to an AMR

The component types requiring an AMR for the Emergency Cooling System and their intended functions are shown in Table 2.3.2.A.4-1. The AMR results for these component types are provided in Table 3.2.2.A-3.

Table 2.3.2.A.4-1
NMP1 Emergency Cooling System

Component Type	Intended Functions
Bolting	Pressure Boundary
Heat Exchangers	Heat Transfer, Pressure Boundary
	Pressure Boundary
Level Gauges	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Tanks	Pressure Boundary
Valves	Pressure Boundary

2.3.2.B NMP2 ENGINEERED SAFETY FEATURES SYSTEMS

NMP2 ESF Systems consist of systems and components designed to function under accident conditions to minimize the severity of an accident or to mitigate the consequences of an accident. In the event of a LOCA, the ESF Systems provide emergency coolant to assure structural integrity of the core, to maintain the integrity of the containment, or to reduce the concentration of fission products expelled to the Reactor Building atmosphere. The following systems are included in this subsection:

- NMP2 Automatic Depressurization System (Section 2.3.2.B.1)
- NMP2 Hydrogen Recombiner System (Section 2.3.2.B.2)
- NMP2 High Pressure Core Spray System (Section 2.3.2.B.3)
- NMP2 Low Pressure Core Spray System (Section 2.3.2.B.4)
- NMP2 Primary Containment Isolation System (Section 2.3.2.B.5)
- NMP2 Reactor Core Isolation Cooling System (Section 2.3.2.B.6)
- NMP2 Residual Heat Removal System (Section 2.3.2.B.7)
- NMP2 Standby Gas Treatment System (Section 2.3.2.B.8)

2.3.2.B.1 NMP2 AUTOMATIC DEPRESSURIZATION SYSTEM

System Description

The purpose of the NMP2 Automatic Depressurization System is to reduce reactor pressure following small line breaks in the event of High Pressure Core Spray (HPCS) failure (Section 2.3.2.B.3). When reactor vessel pressure is reduced to within the capacity of the low-pressure systems [Low Pressure Core Spray (described in the Residual Heat Removal System, Section 2.3.2.B.4) and Low Pressure Core Injection (Section 2.3.2.B.7)], these systems provide inventory makeup to maintain acceptable post-accident temperatures.

The Automatic Depressurization System employs seven nuclear steam supply system pressure relief valves to relieve high-pressure steam to the suppression pool. Automatic Depressurization System instrumentation and controls are also included with this system.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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) and environmental qualification (10 CFR 50.49).

USAR Reference(s)

More information about the Automatic Depressurization System can be found in USAR Sections 1.2.9.8, 6.3.1.2.4, 6.3.2.2.2, 7.3.1.1.1.2, and 9.3.1.4

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

The component types subject to an AMR that perform the system intended functions for the Automatic Depressurization System are part of, and evaluated in, the Main Steam System (Section 2.3.4.B.4). No additional components within the Automatic Depressurization System are subject to aging management review.

2.3.2.B.2 NMP2 HYDROGEN RECOMBINER SYSTEM

System Description

The purpose of the NMP2 Hydrogen Recombiner System is to process the hydrogen and oxygen released to the primary containment during a LOCA.

The Hydrogen Recombiner System takes suction from the drywell and suppression pool, recombines the hydrogen and oxygen gases, and returns the resulting water vapor and other gases to the suppression pool. The system consists of suction piping, two redundant recombiner units, and discharge piping and isolation valves. Each recombiner unit consists of a blower, electric heater, reaction chamber and water spray coolers. Hydrogen Recombiner System instrumentation and controls are also included in this system.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49).

The components subject to an AMR extend from the recombiner unit to the primary containment drywell and suppression chamber.

USAR Reference(s)

More information about the Hydrogen Recombiner System can be found in USAR Section 6.2.5.2.2.

License Renewal Drawings

Components requiring an AMR for the Hydrogen Recombiner System are highlighted on the following drawings:

- LR-062, Sheet A, Revision 0, DBA Hydrogen Recombiner
- LR-062, Sheet B, Revision 0, DBA Hydrogen Recombiner

Components Subject to an AMR

The component types requiring an AMR for the Hydrogen Recombiner System and their intended functions are shown in Table 2.3.2.B.2-1. The AMR results for these component types are provided in Table 3.2.2.B-1.

Table 2.3.2.B.2-1
NMP2 Hydrogen Recombiner System

Component Type	Intended Functions
Blowers	Pressure Boundary
Bolting	Pressure Boundary
Filters/Strainers	Pressure Boundary
Flow Elements	Pressure Boundary
Hydrogen Recombiners	Pressure Boundary
Piping and Fittings	Pressure Boundary
Valves	Pressure Boundary

2.3.2.B.3 NMP2 HIGH PRESSURE CORE SPRAY SYSTEM

System Description

The purpose of the NMP2 High Pressure Core Spray (HPCS) System is to maintain RPV coolant inventory after small breaks that do not depressurize the RPV. The HPCS System also provides spray cooling heat transfer during breaks in which core uncovery is calculated.

The HPCS System consists of two redundant suction lines, a single pump, discharge piping, isolation valves, and two spargers, with nozzles, inside the RPV. One suction line (primary) is from a Condensate Storage Tank while the other line is from the suppression pool. A low flow bypass line to the suppression pool is also included in the HPCS system. HPCS System instrumentation and controls are also included within this system.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), and anticipated transients without scram (10 CFR 50.62).

The components subject to an AMR extend from the suppression pool and one of the CSTs to the HPCS nozzle on the RPV. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Pipe Tunnel and Reactor Building (secondary containment).

USAR Reference(s)

More information about the HPCS System can be found in USAR Sections 6.3.1.2.1 and 6.3.2.2.1.

License Renewal Drawings

Components requiring an AMR for the HPCS System are highlighted on the following drawings:

- LR-033, Sheet A, Revision 0, High Pressure Core Spray System
- LR-033, Sheet B, Revision 0, High Pressure Core Spray System

Components Subject to an AMR

The component types requiring an AMR for the High Pressure Core Spray System and their intended functions are shown in Table 2.3.2.B.3-1. The AMR results for these component types are provided in Table 3.2.2.B-2.

Table 2.3.2.B.3-1
NMP2 High Pressure Core Spray System

Component Type	Intended Functions
Bolting	Pressure Boundary
Filters/Strainers	Pressure Boundary
Flow Elements	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Restriction Orifices	Pressure Boundary
Valves	Pressure Boundary

2.3.2.B.4 NMP2 LOW PRESSURE CORE SPRAY SYSTEM

System Description

The purpose of the NMP2 Low Pressure Core Spray (LPCS) System is to provide RPV coolant inventory makeup and spray cooling during large breaks in which the core is calculated to uncover. Also, following a small break and Automatic Depressurization System (Section 2.3.2.B.1) initiation, the LPCS System provides coolant inventory makeup.

The LPCS System consists of a suction line from the suppression pool, a single pump, discharge piping, isolation valves, and two spargers, with nozzles, inside the RPV. A low flow bypass line to the suppression pool is also included in the LPCS system. LPCS System instrumentation and controls are also included within this system.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

The components subject to an AMR extend from the suppression pool suction to the low pressure core spray nozzle on the RPV. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Reactor Building (secondary containment).

USAR Reference(s)

More information about the LPCS System can be found in USAR Sections 6.3.1.2.2 and 6.3.2.2.3.

License Renewal Drawings

Components requiring an AMR for the LPCS System are highlighted on the following drawing:

- LR-032, Sheet A, Revision 0, Low Pressure Core Spray

Components Subject to an AMR

The component types requiring an AMR for the LPCS System and their intended functions are shown in Table 2.3.2.B.4-1. The AMR results for these component types are provided in Table 3.2.2.B-3.

Table 2.3.2.B.4-1
NMP2 Low Pressure Core Spray System

Component Type	Intended Functions
Bolting	Pressure Boundary
Filters/Strainers	Pressure Boundary
Flow Elements	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Restriction Orifices	Pressure Boundary
Valves	Pressure Boundary

2.3.2.B.5 NMP2 PRIMARY CONTAINMENT ISOLATION SYSTEM

System Description

The purpose of the NMP2 Primary Containment Isolation System is to provide protection against a release of radioactive materials to the environment from accidents occurring to the Reactor Coolant Pressure Boundary (RCPB), lines connected to the RCPB, or lines that penetrate the primary containment. This is accomplished by automatic isolation valve closure of appropriate lines that penetrate the primary containment system.

The Primary Containment Isolation System consists of automatic isolation valves and associated piping for lines that penetrate the primary containment.

This system is in scope for license renewal for the following reason:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the Primary Containment Isolation System can be found in USAR Section 6.2.4.

License Renewal Drawings

None (See Components Subject to an AMR below)

Components Subject to an AMR

The component types requiring an AMR for the Primary Containment Isolation System are evaluated in their respective systems.

2.3.2.B.6 NMP2 REACTOR CORE ISOLATION COOLING SYSTEM

System Description

The purpose of the NMP2 Reactor Core Isolation Cooling (RCIC) System is to assure that sufficient reactor water inventory is maintained in the reactor vessel to permit adequate core cooling following those events, in which, the normal feedwater supply is unavailable. This system can be used for accident and non-accident conditions.

The RCIC System consists of two redundant suction lines, a turbine-driven pump, discharge piping, isolation valves, and injection piping connected to the RPV head. The primary suction line is from one of the condensate storage tanks while the other line is from the suppression pool. The RCIC turbine is supplied steam from one of the main steam lines and discharges its exhaust water to the suppression pool. The RCIC System also is equipped with a discharge line fill pump that operates to maintain the pump discharge line in a filled condition. RCIC instrumentation and controls are also included within this system.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), and station blackout (10 CFR 50.63).

The components subject to an AMR extend from the suppression pool and CST to the RPV. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Reactor Building (secondary containment).

USAR Reference(s)

More information about the RCIC System can be found in USAR Sections 5.4.6 and 7.4.1.1.

License Renewal Drawings

Components requiring an AMR for the RCIC System are highlighted on the following drawings:

- LR-035, Sheet A, Revision 0, Reactor Core Isolation Cooling
- LR-035, Sheet B, Revision 0, Reactor Core Isolation Cooling
- LR-035, Sheet C, Revision 0, Reactor Core Isolation Cooling
- LR-035, Sheet D, Revision 0, Reactor Core Isolation Cooling

Components Subject to an AMR

The component types requiring an AMR for the RCIC System and their intended functions are shown in Table 2.3.2.B.6-1. The AMR results for these component types are provided in Table 3.2.2.B-4.

Table 2.3.2.B.6-1
NMP2 Reactor Core Isolation Cooling System

Component Type	Intended Functions
Blower	NSR Functional Support
Bolting	Pressure Boundary
Condensing Chambers	Pressure Boundary
Drain Pots	Pressure Boundary
Filters/Strainers	NSR Functional Support
	Pressure Boundary
Flow Elements	Pressure Boundary
Heat Exchangers	Heat Transfer, Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	NSR Functional Support
	Pressure Boundary
Pumps	Pressure Boundary
Restriction Orifices	NSR Functional Support
	Pressure Boundary
Rupture Discs	Pressure Boundary
Terry Turbine	Pressure Boundary
Valves	NSR Functional Support
	Pressure Boundary

2.3.2.B.7 NMP2 RESIDUAL HEAT REMOVAL SYSTEM

System Description

The NMP2 Residual Heat Removal (RHR) System is composed of three independent loops, each containing a motor-driven pump, piping, valves, instrumentation and controls. Each loop has a suction source from the suppression pool and is capable of discharging water to either the reactor vessel via a separate nozzle, or back to the suppression pool via a full-flow test line. The A and B loops have heat exchangers that are cooled by service water. Loops A and B can also take suction from the reactor recirculation system suction and can discharge into the reactor recirculation discharge or to the suppression pool and drywell spray spargers. The A and B loops also have connections to reactor steam via the RCIC steam line (Section 2.3.2.B.6) and can discharge the resultant condensate to the RCIC pump suction or to the suppression pool. In addition, Loops A and B take suction from the fuel pool and discharge to the fuel pool cooling discharge.

The three loops of the RHR System combine to fulfill five modes of operation. Each mode has its own functional requirements and is presented separately as follows:

Low Pressure Coolant Injection Mode

All three loops provide water from the suppression pool to the bypass region inside the reactor vessel shroud, through three separate reactor vessel penetrations, to provide inventory makeup following large pipe breaks. Following a small break and Automatic Depressurization System (Section 2.3.2.B.1) initiation, this mode provides coolant inventory makeup.

Suppression Pool Cooling Mode

The Suppression Pool Cooling mode ensures that the suppression pool temperature does not exceed design limits following a reactor vessel blowdown or isolation event.

Containment Spray Cooling Mode

The Containment Spray Cooling mode provides two redundant means to spray the drywell and suppression pool to reduce internal pressure to below design limits.

Reactor Steam-Condensing Mode

The Reactor Steam-Condensing mode provides, in conjunction with the Reactor Core Isolation Cooling turbine, the capability to condense all of the steam generated 1 ½ hours after a reactor scram.

Shutdown Cooling Mode

The Shutdown Cooling mode provides the capability to remove decay and sensible heat from the reactor primary system so that the cold shutdown condition can be achieved and maintained.

The RHR system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), and station blackout (10 CFR 50.63).

The components subject to an AMR extend from the suction source, through the applicable train, to the discharge point. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Primary Containment Structure, Radwaste Building, Reactor Building (secondary containment), and Standby Gas Treatment Building.

USAR Reference(s)

More information about the RHR System can be found in USAR Section 5.4.7.

License Renewal Drawings

Components requiring an AMR for the RHR System are highlighted on the following drawings:

- LR-031, Sheet A, Revision 0, Residual Heat Removal System
- LR-031, Sheet B, Revision 0, Residual Heat Removal System

- LR-031, Sheet C, Revision 0, Residual Heat Removal System
- LR-031, Sheet D, Revision 0, Residual Heat Removal System
- LR-031, Sheet E, Revision 0, Residual Heat Removal System
- LR-031, Sheet F, Revision 0, Residual Heat Removal System
- LR-031, Sheet G, Revision 0, Residual Heat Removal System

Components Subject to an AMR

The component types requiring an AMR for the RHR System and their intended functions are shown in Table 2.3.2.B.7-1. The AMR results for these component types are provided in Table 3.2.2.B-5.

Table 2.3.2.B.7-1
NMP2 Residual Heat Removal System

Component Type	Intended Functions
“T” Quenchers	Pressure Boundary
Bolting	Pressure Boundary
Condensing Chambers	Pressure Boundary
Filters/Strainers	Pressure Boundary
Flow Elements	Pressure Boundary
Heat Exchangers	Heat Transfer, Pressure Boundary
Level Elements	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Restriction Orifices	Pressure Boundary
Temperature Elements	Pressure Boundary
Valves	Pressure Boundary

2.3.2.B.8 NMP2 STANDBY GAS TREATMENT SYSTEM

System Description

The purpose of the NMP2 Standby Gas Treatment System (SGTS) is to limit the release of radioactive gases from the reactor building to the environment within the guidelines of 10CFR100 in the event of a LOCA and to maintain a negative pressure in the reactor building under accident conditions. It is also used to provide charcoal filtration of the primary containment atmosphere when inerting, deinerting or controlling primary containment pressure.

The SGTS consists of two separate and redundant trains that draws air from the reactor building and exhausts air to the main stack via a common exhaust line. Each train consists of an inlet damper, demister, electric heating coil, bank of prefilters, bank of HEPA filters, bank of charcoal adsorber filters, a second bank of HEPA filters, fan, exhaust damper, and associated piping. Each charcoal filter train has an integrally mounted water (deluge) fire extinguishing facility consisting of discharge nozzles and distribution pipe. The air supply for the inlet and outlet dampers is normally from the Instrument Air System. Backup supply is provided by compressed air bottles or an externally connected tank. SGTS instrumentation and controls are also included within this system.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49).

The components subject to an AMR include the post-accident truck/bottle fills, which supply air for air-operated valves and include components that extend from the intake dampers inside the Reactor Building through the filtration system to the main stack.

USAR Reference(s)

More information about the SGTS can be found in USAR Section 6.5.1.

License Renewal Drawings

Components requiring an AMR for the SGTS are highlighted on the following drawings:

- LR-061, Sheet B, Revision 0, Primary Containment Purge & Standby Gas Treatment
- LR-061, Sheet C, Revision 0, Stand-By Gas

Components Subject to an AMR

The component types requiring an AMR for the SGTS and their intended functions are shown in Table 2.3.2.B.8-1. The AMR results for these component types are provided in Table 3.2.2.B-6.

Table 2.3.2.B.8-1
NMP2 Standby Gas Treatment System

Component Type	Intended Functions
Blowers	Pressure Boundary
Bolting	Pressure Boundary
Filters/Strainers	Filtration, Pressure Boundary
Flow Elements	Pressure Boundary
Heaters	Pressure Boundary
Piping and Fittings	Pressure Boundary
Restriction Orifices	Pressure Boundary
Tanks	Pressure Boundary
Valves	Pressure Boundary

2.3.3 AUXILIARY SYSTEMS

The NMP1 and NMP2 Auxiliary Systems are described in Sections 2.3.3.A and 2.3.3.B, respectively.

2.3.3.A NMP1 AUXILIARY SYSTEMS

NMP1 Auxiliary Systems are those systems used to support normal and emergency plant operations. The systems provide cooling, ventilation, sampling, and other required functions. The following systems are included in this subsection:

- NMP1 Administration Building Heating, Ventilation, and Air Conditioning (HVAC) System (Section 2.3.3.A.1)
- NMP1 Circulating Water System (Section 2.3.3.A.2)
- NMP1 City Water System (Section 2.3.3.A.3)
- NMP1 Compressed Air Systems (Section 2.3.3.A.4)
- NMP1 Containment Systems (Section 2.3.3.A.5)
- NMP1 Control Room HVAC System (Section 2.3.3.A.6)
- NMP1 Diesel Generator Building Ventilation System (Section 2.3.3.A.7)
- NMP1 Emergency Diesel Generator System (Section 2.3.3.A.8)
- NMP1 Fire Detection and Protection System (Section 2.3.3.A.9)
- NMP1 Hydrogen Water Chemistry System (Section 2.3.3.A.10)
- NMP1 Liquid Poison System (Section 2.3.3.A.11)
- NMP1 Miscellaneous Non-Contaminated Vents and Drains System (Section 2.3.3.A.12)
- NMP1 Neutron Monitoring System (Section 2.3.3.A.13)
- NMP1 Process Radiation Monitoring System (Section 2.3.3.A.14)

- NMP1 Radioactive Waste Disposal Building HVAC System (Section 2.3.3.A.15)
- NMP1 Radioactive Waste System (Section 2.3.3.A.16)
- NMP1 Reactor Building Closed Loop Cooling Water System (Section 2.3.3.A.17)
- NMP1 Reactor Building HVAC System (Section 2.3.3.A.18)
- NMP1 Reactor Water Cleanup System (Section 2.3.3.A.19)
- NMP1 Sampling System (Section 2.3.3.A.20)
- NMP1 Service Water System (Section 2.3.3.A.21)
- NMP1 Shutdown Cooling System (Section 2.3.3.A.22)
- NMP1 Spent Fuel Pool Filtering and Cooling System (Section 2.3.3.A.23)
- NMP1 Technical Support Center HVAC System (Section 2.3.3.A.24)
- NMP1 Turbine Building Closed Loop Cooling Water System (Section 2.3.3.A.25)
- NMP1 Turbine Building HVAC System (Section 2.3.3.A.26)

Note: The NMP1 Liquid Poison System, the Combustible Gas Control System (a subsystem of the NMP1 Containment Systems), and the Emergency Ventilation System (a subsystem of the NMP1 Reactor Building HVAC System) are classified as Engineered Safety Feature (ESF) Systems in the NMP1 (USAR). However, these systems are evaluated in this section because of similarities with other systems that are characterized as Auxiliary Systems in NUREG-1801.

2.3.3.A.1 NMP1 ADMINISTRATION BUILDING HEATING, VENTILATION, AND AIR CONDITIONING (HVAC) SYSTEM

System Description

The NMP1 Administration Building HVAC is designed to provide equipment ventilation and personnel comfort. The Administration Building HVAC System supplies air to the Administration Building and its extension. This system consists of a rooftop air conditioning unit, supply fans, exhaust fans, and associated ductwork. Individual heating and air conditioning units are provided throughout the original Administration Building and the Administration Building extension for personnel comfort. The Administration Building HVAC System louvered penthouse damper assembly also provides outside air to the Control Room HVAC System (Section 2.3.3.A.6).

This system is in scope for license renewal for the following reason:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

USAR Reference(s)

More information about the Administration Building HVAC System can be found in USAR Section III.E.1.2.2.

License Renewal Drawing(s)

None (see Components Subject to an AMR below)

Components Subject to an AMR

The only components requiring an Aging Management Review (AMR) for the Administration Building HVAC System are the louvered penthouse damper assembly and cooling coil tubes that are shared with the Control Room HVAC System (Section 2.3.3.A.6) and are evaluated in that system. The remaining in-scope components for the Administration Building HVAC System are active components. Therefore, there are no components requiring an AMR for the Administration Building HVAC System.

2.3.3.A.2 NMP1 CIRCULATING WATER SYSTEM

System Description

The NMP1 Circulating Water System provides cooling water from Lake Ontario to the main condenser. Lake water is drawn from the intake tunnel through two parallel gates, three trains of mechanical rakes and traveling screens, to the suction of two redundant circulating water pumps. Each pump discharges in a separate line to one side of the condenser divided water box. Fish screens and sluice valves are installed in each line to prevent debris backwashing into the inlet tunnel. After leaving the condenser, the circulating water is discharged back into the lake.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

The components subject to an AMR for this system include the mechanical rakes, traveling screens, and circulating water gates. The safety-related hoists for this system are evaluated as part of the Material Handling System (Section 2.4.A.5).

USAR Reference(s)

More information about the Circulating Water System can be found in USAR Section XI.B.4.

License Renewal Drawing(s)

Components requiring an AMR for the Circulating Water System are highlighted on the following drawings:

- LR-18022-C, Sheet 1, Revision 0, Service Water Reactor & Turbine Bldgs. (P&ID)
- LR-26941-C, Revision 0, Circulating Water System NPDES Permit (P&ID)

Components Subject to an AMR

The component types requiring an AMR for the Circulating Water System and their intended functions are shown in Table 2.3.3.A.2-1. The AMR results for these component types are provided in Table 3.3.2.A-1.

Table 2.3.3.A.2-1
NMP1 Circulating Water System

Component Type	Intended Functions
Circulating water gates	NSR Functional Support
Traveling screens and rakes	Filtration

2.3.3.A.3 NMP1 CITY WATER SYSTEM

System Description

The NMP1 City Water System provides hot and cold domestic water to various areas within the station. Cold water is distributed to the Lab, Decontamination Room, Laundry, Administration Building, emergency showers and two electric hotwater heaters. Hot water is supplied to the Lab and Administration Building.

The City Water System consists of a storage tank, hot water heater, hot water circulating pumps, pressure control valve and associated piping, valves, instrumentation and controls. The system is supplied by the offsite water system. The City Water System contains one safety-related breaker since a hot water circulating pump is powered from a safety-related powerboard.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components subject to an AMR for this system include the NSR piping, fittings, and equipment containing liquid in the Reactor Building, Radwaste Solidification and Storage Building, Screen and Pump House Building, and Turbine Building.

USAR Reference(s)

None

License Renewal Drawing(s)

None (the only components that are subject to an AMR are NSR piping, fittings, and equipment containing liquid, which are not shown on any license renewal drawings).

Components Subject to an AMR

The component types requiring an AMR for the City Water System and their intended functions are shown in Table 2.3.3.A.3-1. The AMR results for these component types are provided in Table 3.3.2.A-2.

Table 2.3.3.A.3-1
NMP1 City Water System

Component Type	Intended Functions
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment

2.3.3.A.4 NMP1 COMPRESSED AIR SYSTEM

System Description

The NMP1 Compressed Air Systems are designed to provide clean, filtered air to various areas of NMP1. The Compressed Air Systems consist of the House Service Air System, the Instrument Air System, and the Breathing Air System. Further information on these systems is provided below.

The House Service Air System is a NSR system designed to provide a reliable source of clean air for use in maintenance and as a backup to the Instrument Air System. House Service Air is supplied by an air compressor. Outside air is drawn through an intake filter from the turbine roof, compressed, cooled, and discharged into a receiver. The House Service Air System contains two SR valves that provide isolation to the mobile air compressor connection taps.

The Instrument Air System is designed to provide a source of clean, dry air for use in instruments, controls, and as a backup to the Breathing Air System. Outside air is drawn through separate intake filters for each Instrument Air compressor, compressed, cooled, and discharged into a receiver. Air then passes through drying and filtering equipment to the instrument and controls and certain processes requiring high-pressure air. The Instrument Air System is comprised of safety-related and non-safety related portions. The NSR portion includes a compressor, receiver, dryer, filters and associated piping, valves, instruments and controls, and services the waste disposal building and other Radwaste systems. The SR portion includes two redundant compressors, receiver, dryer, filters, the containment spray air test receiver and associated piping, valves, instruments and controls. There is also a SR intertie valve separating the SR and NSR portions. The SR portion of the Instrument Air System services various loads throughout NMP1 for the operation of pneumatic devices.

The Breathing Air System is a NSR system designed to provide a reliable supply of clean, filtered air fit for human breathing. In the event of failure of the breathing air compressor, Breathing Air can be supplied from the Instrument Air System. Breathing Air is supplied by an air compressor.

Outside air is drawn through an intake filter from the Turbine Building roof, compressed, cooled, filtered of dust, and discharged into a receiver. The Breathing Air System contains SR valves that are intertie valves to the Instrument Air System and Primary Containment Isolation Valves.

The Compressed Air Systems are in scope for license renewal for the following reasons:

- They perform safety-related functions per 10 CFR 54.4(a)(1).
- They contain SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49) and station blackout (10 CFR 50.63).

The components subject to an AMR include:

- The safety related portion of the Instrument Air System from the air intakes to the plant's instrument air loads;
- The safety related piping and valves that provide the intertie from the Instrument Air system to the Service Air and Breathing Air systems;
- The safety related portion of the Service Air System for connection to the mobile compressor
- The instrument air lines, manifolds, and valves that supply air operators for safety-related remote isolation/control valves, that supply other safety-related components/functions (e.g., the inflatable seal for the Reactor Building track bay door inflatable seal, containment spray system air test), or that serve as a pressure boundary in the instrument air flow paths to those safety-related operators/components/functions.

USAR Reference(s)

More information about the Compressed Air Systems can be found in USAR Section X.I.

License Renewal Drawing(s)

Components requiring an AMR for the Compressed Air Systems are highlighted on the following drawings:

- LR-18005-C, Sheet 1, Revision 0, Feedwater Flow, High Pressure
- LR-18005-C, Sheet 3, Revision 0, Feedwater Flow High Pressure (Flow Control Valve 29-134) P&ID
- LR-18006-C, Sheet 3, Revision 0, Drywell and Torus, Isolation Valves
- LR-18007-C, Sheet 1, Revision 0, Reactor Core Spray
- LR-18008-C, Revision 0, Spent Fuel Storage Pool, Filtering and Cooling System
- LR-18011-C, Sheet 1, Revision 0, Breathing and Service Air Systems
- LR-18011-C, Sheet 2, Revision 0, Instrument Air System
- LR-18011-C, Sheet 3, Revision 0, Reactor Building, Instrument Air System
- LR-18011-C, Sheet 4, Revision 0, Instrument Air System, Inst. Air Dryers 94-168, 94-169
- LR-18011-C, Sheet 5, Revision 0, Turbine Building, Instrument Air System
- LR-18011-C, Sheet 6, Revision 0, Turbine Auxiliary Extension Building and Screen and Pump House, Instrument Air System
- LR-18012-C, Sheet 2, Revision 0, Reactor Containment, Spray System
- LR-18013-C, Revision 0, Reactor Building Heating, Cooling and Ventilating System
- LR-18014-C, Sheet 1, Revision 0, Reactor Containment (Drywell & Torus) Inert Gas (N2) Purge and Fill, Drywell Cooling System
- LR-18014-C, Sheet 2, Revision 0, Drywell & Torus Leak Rate & Anal., T.I.P. Sys. Electrical Pen & N2 Supply
- LR-18016-C, Sheet 1, Revision 0, Control Rod Drive

- LR-18016-C, Sheet 2, Revision 0, Control Rod Drive, Scram Dump Volume
- LR-18017-C, Sheet 1, Revision 0, Emergency Cooling System
- LR-18047-C, Revision 0, Control Room, Heating Ventilating & Air Cond. Sys.
- LR-22108-C, Sheet 9, Revision 0, Instrument Air Supply, Turbine Building, El. 261'-0" @ Column "H-9"
- LR-22108-C, Sheet 28, Revision 0, Instrument Air Supply, Turbine Building, El. 291'-0" @ Column "H-10"
- LR-22108-C, Sheet 34, Revision 0, Instrument Air Supply, Turbine Building, El. 369'-0" @ Column "G-8"
- LR-22108-C, Sheet 42, Revision 0, Instrument Air Supply, Turbine Building, El. 261'-0" @ Column "D-2"
- LR-22108-C, Sheet 43, Revision 0, Instrument Air Supply, Turbine Building, El. 261'-0" @ Column "D-3"
- LR-22109-C, Sheet 3, Revision 0, Instrument Air Supply, Turbine Building, El. 261'-0" @ Column "H-9"
- LR-22109-C, Sheet 9, Revision 0, Instrument Air Piping
- LR-22109-C, Sheet 10, Revision 0, Instrument Air Supply, Turbine Building, El. 277'-0" @ Column "BE-5"
- LR-22110-C, Sheet 1, Revision 0, Instrument Air Supply, Reactor Building, El. 237'-0" @ Column "L-6"
- LR-22110-C, Sheet 2, Revision 0, Instrument Air Supply, Reactor Building, El. 237'-0" @ Column "N-11"
- LR-22110-C, Sheet 6, Revision 0, Instrument Air Supply, Reactor Building, El. 237'-0" @ Column "P-8"
- LR-22110-C, Sheet 14, Revision 0, Instrument Air Supply, Reactor Building, El. 281'-0" @ Column "N-8"

- LR-22110-C, Sheet 15, Revision 0, Instrument Air Supply, Reactor Building, El. 281'-0" @ Column "P-12"
- LR-22110-C, Sheet 16, Revision 0, Instrument Air Supply, Reactor Building, El. 281'-0" @ Column "N-8"
- LR-22110-C, Sheet 19, Revision 0, Instrument Air Supply, Reactor Building, El. 281'-0" @ Column "M-11"
- LR-22110-C, Sheet 20, Revision 0, Instrument Air Supply, Reactor Building, El. 281'-0" @ Column "L-7"
- LR-22110-C, Sheet 21, Revision 0, Instrument Air Supply, Reactor Building, El. 281'-0" @ Column "N-7"
- LR-22110-C, Sheet 22, Revision 0, Instrument Air Supply, Reactor Building, El. 298'-0" @ Column "N-9"
- LR-22110-C, Sheet 23, Revision 0, Instrument Air Supply, Reactor Building, El. 298'-0" @ Column "N-10"
- LR-22110-C, Sheet 26, Revision 0, Instrument Air Supply, Reactor Building, El. 298'-0" @ Column "M-6"
- LR-22110-C, Sheet 27, Revision 0, Instrument Air Supply, Reactor Building, El. 318'-0" @ Column "L-12"
- LR-22110-C, Sheet 28, Revision 0, Instrument Air Supply, Reactor Building, El. 340'-0" @ Column "Q-7"
- LR-22110-C, Sheet 29, Revision 0, Instrument Air Supply, Reactor Building, El. 340'-0" @ Column "P-8"
- LR-22110-C, Sheet 30, Revision 0, Instrument Air Supply, Reactor Building, El. 340'-0" @ Column "Q-9"
- LR-22110-C, Sheet, 33, Revision 0, Instrument Air Supply, Reactor Building, EL. 281' - 0" @ Column "K-9"
- LR-22110-C, Sheet 35, Revision 0, Instrument Air Supply, Reactor Building, El. 298'-0" @ Column "N-10"
- LR-22110-C, Sheet 37, Revision 0, Instrument Air Supply, Reactor Building, El. 237'-0" @ Column "K-10"

- LR-22110-C, Sheet 39, Revision 0, Instrument Air Supply, Reactor Building, El. 318'-0" @ Column "P-8"
- LR-22110-C, Sheet 40, Revision 0, Instrument Air Supply, Reactor Building, El. 298'-0" @ Column "N-7"
- LR-22110-C, Sheet 41, Revision 0, Instrument Air Supply, Reactor Building, El. 298'-0" @ Column "N-8"
- LR-22110-C, Sheet 42, Revision 0, Instrument Air Supply, Reactor Building, El. 298'-0" @ Column "L-9"
- LR-22110-C, Sheet 43, Revision 0, Instrument Air Supply, Reactor Building, El. 261'-0" @ Column "P-11"
- LR-22110-C, Sheet 46, Revision 0, Instrument Air Supply, Reactor Building, El. 298'-0" @ Column "L-7"
- LR-22110-C, Sheet 47, Revision 0, Instrument Air Supply, Reactor Building, El. 281'-0" @ Column "K-7"
- LR-22110-C, Sheet 48, Revision 0, Instrument Air Supply, Reactor Building, El. 237'-0" Column "K-7"
- LR-22110-C, Sheet 49, Revision 0, Instrument Air Supply, Reactor Building, EL. 298' - 0"@ Column "M-7"
- LR-22111-C, Sheet 1, Revision 0, Instrument Air Supply, Reactor Building, El. 237'-0" @ Column "M-11"
- LR-22111-C, Sheet 5, Revision 0, Instrument Air Supply, Reactor Building, El. 281'-0" @ Column "P-9"
- LR-22111-C, Sheet 6, Revision 0, Instrument Air Supply, Reactor Building, El. 281'-0" @ Column "N-10"
- LR-22112-C, Sheet 4, Revision 0, Instrument Piping for Air Supply, Turb. Extension Bldg. El. 289'-9" at Column Mb-16
- LR-22112-C, Sheet 5, Revision 0, Instrument Air Supply, Turbine Extension Building, El. 261' @ Column "Q-14"
- LR-22113-C, Sheet 1, Revision 0, Instrument Piping From Air Supply at Post on Column Row "Nc" Between 13 & 14

- LR-22113-C, Sheet 2, Revision 0, Instrument Air Supply, Turbine Extension Building, El. 289'-9" @ Column "NC-12A"

Components Subject to an AMR

The component types requiring an AMR for the Compressed Air Systems and their intended functions are shown in Table 2.3.3.A.4-1. The AMR results for these component types are provided in Table 3.3.2.A-3.

Table 2.3.3.A.4-1
NMP1 Compressed Air Systems

Component Type	Intended Functions
Air Dryers • Couplings • Flanges • Heads • Nozzles • Piping	Pressure Boundary
Air Receivers	Pressure Boundary
Bolting	Pressure Boundary
Drain Traps	Pressure Boundary
Filters/Strainers	Filtration, Pressure Boundary
	Pressure Boundary
Heat Exchangers	Heat Transfer, Pressure Boundary
	Pressure Boundary
Orifices	Pressure Boundary
Piping and Fittings	Pressure Boundary
Regulators	Pressure Boundary
Separators	Filtration, Pressure Boundary
Valves	Pressure Boundary

2.3.3.A.5 NMP1 CONTAINMENT SYSTEM

System Description

The NMP1 Containment Systems are designed to control and monitor the primary containment environment. The Containment Systems consist of the Combustible Gas Control System, Primary Containment Area Cooling System, Containment Atmospheric Monitoring System, Torus Temperature Monitoring System, Torus Drain System, and the Integrated Leak Rate Monitoring System. Further information on these systems is provided below.

The Combustible Gas Control System is designed to prevent a combustible hydrogen-oxygen concentration from accumulating in the primary containment atmosphere immediately following or during a Loss-of-Coolant Accident (LOCA). The Combustible Gas Control System consists of the Containment Inerting System and the Containment Atmosphere Dilution System.

The Containment Inerting System is used to inert and deinert primary containment and to makeup nitrogen as required to maintain low oxygen concentration and containment pressure. The system consists of nitrogen storage tanks, vaporing units, vent and purge fan and associated piping and valves. The discharge of the fan is normally aligned to the main stack but can be aligned to the Reactor Building Emergency Vent System.

The Containment Atmosphere Dilution System is designed to monitor and maintain the oxygen concentration of the primary containment atmosphere to less than four percent during a LOCA. The Containment Atmosphere Dilution System functions by adding nitrogen to the primary containment atmosphere from the same supply as the Containment Inerting System. The H_2O_2 Monitoring System continuously monitors hydrogen and oxygen levels during normal operations and emergency conditions.

The Primary Containment Area Cooling System is designed to remove and dissipate the primary containment area heat gain. During normal operation, heat is released to the drywell as heat losses from the reactor, recirculation pump motors, hot pipes, and other equipment. Drywell cooling is accomplished by fan type coolers, which are cooled by the Reactor Building Closed Loop Cooling Water System (Section 2.3.3.A.17).

The Containment Atmospheric Monitoring System continuously monitors and provides Control Room indication of the containment airborne radioactivity level. This provides for detection of leaks of the reactor primary systems.

The Torus Temperature Monitoring System provides information on torus temperature, water level and airspace pressure to ensure that the cooling capacity of water maintained in the suppression chamber is available within the Technical Specification limits and to ensure that the containment structural integrity is maintained.

The Torus Drain System is used when the reactor is in cold shutdown or refueling condition. It allows the torus to be dewatered to permit maintenance or other activities.

The Integrated Leak Rate Monitoring System is used to support periodic 10 CFR 50 Appendix J testing for overall leakage from primary containment, which demonstrates the ability of containment to control the spread of radioactivity in the event of an accident.

The Containment systems are in scope for license renewal for the following reasons:

- They perform safety-related functions per 10 CFR 54.4(a)(1).

- They contain SCs 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), and station blackout (10 CFR 50.63).

The components subject to an AMR in this system are as follows:

- Combustible Gas Control System - bypass pumps, sample pumps, nitrogen storage tanks, heat exchangers (ambient vaporizers), flame arrestors, rupture disks, filters/strainers, containment isolation valves, and the connecting piping, fittings, and valves.

- Primary Containment Area Cooling System - housings for the drywell air coolers and the inlet ducting from the upper containment areas through the coolers to the cooler duct discharge.

- Containment Atmospheric Monitoring System – the piping, fittings, and valves.

- Torus Temperature Monitoring System - only contains active components; therefore, there are no components subject to an AMR.

- Torus Drain System - three capped drain lines, with their inclusive valves, connected to the bottom of the torus, one of which contains a sample line.

- Torus Dewatering System - the piping, fittings, and four valves, two of which are check valves with the disks removed.

USAR Reference(s)

More information about the Containment Systems can be found in USAR Sections VI and VII.G.

License Renewal Drawing(s)

Components requiring an AMR for the Containment Systems are highlighted on the following drawings:

- LR-18006-C, Sheet 1, Revision 0, Drywell & Torus, Isolation Valves (P&ID)
- LR-18006-C, Sheet 2, Revision 0, Drywell & Torus, Isolation & Blocking Valves (P&ID)
- LR-18006-C, Sheet 3, Revision 0, Drywell and Torus Isolation Valves (P&ID)
- LR-18007-C, Sheet 1, Revision 0, Reactor Core Spray (P&ID)
- LR-18013-C, Revision 0, Reactor Building Heating, Cooling and Ventilating System (P&ID)
- LR-18014, Sheet 5, Revision 0, Reactor Containment Drywell and Torus Mechanical and Electrical Penetration Leakage Test Stations (P&ID)
- LR-18014-C, Sheet 1, Revision 0, Reactor Containment (Drywell & Torus) Inert Gas (N2) Purge and Fill, Drywell Cooling System (P&ID)
- LR-18014-C, Sheet 2, Revision 0, Drywell & Torus Leak Rate & Anal. T.I.P. Sys. Electrical Pen & N2 Supply (P&ID)
- LR-18014-C, Sheet 3, Revision 0, Reactor Containment Drywell & Torus Inert Gas (N2) Supply No. 11 (P&ID)
- LR-18014-C, Sheet 4, Revision 0, Reactor Containment Drywell & Torus Inert Gas (N2) Supply No. 12 (P&ID)

- LR-18014-C, Sheet 6, Revision 0, Reactor Containment Drywell and Torus Mechanical and Electrical Penetration Leakage Test Stations (P&ID)
- LR-18022-C, Sheet 2, Revision 0, Reactor Bldg., Closed Loop Cooling System (P&ID)
- LR-26939-C, Revision 0, Primary Containment Atmosphere H2-O2 Monitor Sys. No. 12 (P&ID)
- LR-26949-C, Revision 0, Primary Containment Atmosphere, H2-O2 Monitor System #11
- LR-45136-C, Sheet 8, Revision 0, Instrumentation, Valve Schedule (P&ID)
- LR-69007-C, Sheet 1, Revision 0, Torus Level SE Corner Instrument Diagram
- LR-69007-C, Sheet 2, Revision 0, Torus Level Northeast Corner Instrument Diagram
- LR-69014-C, Sheet 1, Revision 0, Drywell Press. & Lvl, West Instrument Room El. 284’-0” Instrument Diagram
- LR-69014-C, Sheet 2, Revision 0, Drywell Press. & Lvl, East Instrument Room El. 284’-0” Instrument Diagram

Components Subject to an AMR

The component types requiring an AMR for the Containment Systems and their intended functions are shown in Table 2.3.3.A.5-1. The AMR results for these component types are provided in Table 3.3.2.A-4.

Table 2.3.3.A.5-1
NMP1 Containment Systems

Component Type	Intended Functions
Bolting	Pressure Boundary
Ducting	Pressure Boundary
Filters/Strainers	Filtration, Pressure Boundary
	Pressure Boundary
Flame Arresters	Pressure Boundary
Flow Elements	Pressure Boundary
Heat Exchangers	Heat Transfer, Pressure Boundary
	Pressure Boundary
Pumps	Pressure Boundary
Rupture Discs	Pressure Boundary
Tanks	Pressure Boundary
Traps	Pressure Boundary
Valves	Pressure Boundary
Vaporizers	Heat Transfer, Pressure Boundary
	Pressure Boundary

2.3.3.A.6 NMP1 CONTROL ROOM HVAC SYSTEM

System Description

The NMP1 Control Room HVAC System provides filtration, pressurization, heating and cooling to the Control Complex during normal and emergency conditions. The system is also equipped with an independent smoke and heat removal system for the Main and Auxiliary Control Rooms and Cable Spreading Room. The Control Room HVAC System is comprised of three functional systems which are the Normal Ventilation, Emergency Ventilation and Smoke Purge Systems. Further information on these systems is provided below.

The Normal Ventilation System provides fresh and recirculated air for heating and cooling the Control Complex during normal operation. Fresh air is drawn into the system through an intake structure shared with the Administration Building HVAC System, passes through a heater, isolation dampers, filters, coolers and to the circulating fan which discharges to various areas in the Control Complex. The coolers are supplied by the chilled water system which is comprised of two redundant chiller trains. Heating is provided by duct mounted electric heaters.

The Emergency Ventilation System provides clean, filtered fresh air combined with recirculated air for heating and cooling the Control Complex during emergency conditions. This system uses the same equipment and flowpath as the Normal Ventilation System except that instead of air passing through the isolation dampers, it is directed to the Emergency Ventilation System components. These components include two redundant fans, a high efficiency filter and a charcoal filter.

The Smoke Purge System is a fire protection ventilation system that removes smoke and heat from the Main and Auxiliary Control Rooms and Cable Spreading Room. This system is comprised of an air make-up fan, exhaust fan and associated dampers and controls to remove smoke and heat from the affected area.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

- It contains SCs 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).

The components subject to an AMR include those from the outside air supply at the Administration Building HVAC louvered penthouse damper assembly to the exhaust to atmosphere from the exhaust fan, including the control room emergency vent fans, the control room circulation fan, as well as those components in the recirculation loop, the Control Room HVAC chilled water system, and the Control Room HVAC makeup inward from its inboard isolation valve.

USAR Reference(s)

More information about the Control Room HVAC System can be found in USAR Section III.B.2.2.

License Renewal Drawing(s)

Components requiring an AMR for the Control Room HVAC System are highlighted on the following drawings:

- LR-18021-C, Sheet 2, Revision 0, Turbine Building Heating Cooling and Ventilating Systems Air Conditioning Sys. for Lab. Areas
- LR-18046-C, Sheet 1, Revision 0, Air Conditioning Sys. for the Admin. Bldg. - Heating and Ventilation Sys. for Shop Stores and Locker Room
- LR-18047-C, Revision 0, Control Room, Heating Ventilating & Air Cond. Sys.
- LR-45136-C, Sheet 8, Revision 0, Instrumentation, Valve Schedule

Components Subject to an AMR

The component types requiring an AMR for the Control Room HVAC System and their intended functions are shown in Table 2.3.3.A.6-1. The AMR results for these component types are provided in Table 3.3.2.A-5.

Table 2.3.3.A.6-1
NMP1 Control Room HVAC System

Component Type	Intended Functions
Blowers	NSR Functional Support
	Pressure Boundary
Bolting	Pressure Boundary
Ducting	Pressure Boundary
Expansion Tank	Pressure Boundary
Filters/Strainers	Filtration, Pressure Boundary
Flow Elements	Pressure Boundary
Heat Exchangers	Heat Transfer, Pressure Boundary
	Pressure Boundary
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Temperature Elements	Pressure Boundary
Valves and Dampers	NSR Functional Support
	Pressure Boundary

2.3.3.A.7 NMP1 DIESEL GENERATOR BUILDING VENTILATION SYSTEM

System Description

The NMP1 Diesel Generator Building Ventilation System is designed to maintain the diesel room temperature below the allowed maximum for continuous operation of the emergency diesel generator. Both diesel generator rooms are equipped with their own ventilation system. The system consists of roof exhaust fans, a roll-up door, electric heaters, and associated controls. The doors operate in conjunction with the room exhaust fan pairs to ensure that the diesel generator room temperature remains below the allowed maximum. The heaters operate to maintain the diesel generator room ambient temperature at or above 50°F.

This system is in scope for license renewal for the following reason:

- It performs a safety-related function per 10 CFR 54.4(a)(1).

The components subject to AMR are the roof-mounted exhaust fan housings.

USAR Reference(s)

None

License Renewal Drawing(s)

The components that are subject to an AMR are not shown on any license renewal drawings.

Components Subject to an AMR

The component types requiring an AMR for the Diesel Generator Building Ventilation System and their intended functions are shown in Table 2.3.3.A.7-1. The AMR results for these component types are provided in Table 3.3.2.A-6.

Table 2.3.3.A.7-1
NMP1 Diesel Generator Building Ventilation System

Component Type	Intended Functions
Blowers	Pressure Boundary

2.3.3.A.8 NMP1 EMERGENCY DIESEL GENERATOR SYSTEM

System Description

The NMP1 Emergency Diesel Generator System provides the standby source of electric power for equipment required for mitigation of the consequences of an accident, for safe shutdown and for maintenance of the station in a safe condition under postulated event and accident scenarios. This system consists of two identical, physically separate, and electrically independent standby diesel generators. Each diesel generator has associated subsystems which assist the unit in performing its safety function. Further information on these subsystems is provided below.

The Diesel Engine subsystem consists of a diesel engine which provides the mechanical power to run the electric generator.

The Fuel Oil subsystem supplies fuel oil for engine combustion and is comprised of the fuel oil storage and handling system and the engine fuel oil system. The fuel oil storage and handling system includes an underground storage tank, skid mounted day tank and fuel oil transfer pump. The engine fuel oil system draws fuel oil from the day tank and delivers it to the engine injector head by a DC pump (engine startup) and engine driven pump (engine operation).

The Air Start subsystem supplies high-pressure air to start the diesel engine. This subsystem includes two identical air compressors, five air tanks and two air start motors.

The Combustion Air Intake and Exhaust subsystem supports the engine combustion process by supplying filtered air to the diesel engine and then discharging the exhaust gases. This subsystem includes an intake filter, silencer, blower, turbocharger assembly and exhaust muffler.

The Lube Oil subsystem provides cooling and lubrication for major engine components. This subsystem includes DC pumps, engine driven pump, strainer, filter and cooler.

The Cooling Water subsystem removes heat from the diesel engine via the engine cooling system and diesel generator raw water cooling system. The engine cooling system is a closed system built into the engine, includes two engine driven pumps and a temperature control valve and transfers heat from the engine to the raw water heat exchangers. The raw water cooling system draws water from the lake and pumps it through a strainer to the raw water heat exchangers and discharges it back to the lake. This system can also be supplied by the fire water system (through a spool piece) in the event of a loss of the raw water cooling pumps.

The Electric Generator subsystem provides the electrical output of the diesel generator unit and includes the required controls. This subsystem includes the generator, voltage regulator and associated controls.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

- It contains SCs 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) and environmental qualification (10 CFR 50.49).

The components subject to an AMR for the emergency diesel generators are those in the diesel starting air, fuel oil supply, lubricating oil, and cooling water subsystems. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Turbine Building.

USAR Reference(s)

More information about the Emergency Diesel Generator System can be found in USAR Section IX.B.4.1.

License Renewal Drawing(s)

Components requiring an AMR for the Emergency Diesel Generator System are highlighted on the following drawings:

- LR-18026-C, Sheet 1, Revision 0, Emergency Diesel Generator #102, Starting Air, Cooling Water, Lube Oil & Fuel

- LR-18026-C, Sheet 2, Revision 0, Emergency Diesel Generator #103, Starting Air, Cooling Water, Lube Oil & Fuel

- LR-18027-C, Sheet 1, Revision 0, Service Water, Turbine & Administration Buildings

Components Subject to an AMR

The component types requiring an AMR for the Emergency Diesel Generator System and their intended functions are shown in Table 2.3.3.A.8-1. The AMR results for these component types are provided in Table 3.3.2.A-7.

Table 2.3.3.A.8-1
NMP1 Emergency Diesel Generator System

Component Type	Intended Functions
Air Intakes	Pressure Boundary
Bolting	Pressure Boundary
Exhausts for Emergency Diesel Generator	Pressure Boundary
Filters/Strainers	Filtration, Pressure Boundary
	NSR Functional Support
	Pressure Boundary
Flow Elements	Pressure Boundary
Flow Glasses	Pressure Boundary
Heat Exchangers	Heat Transfer, Pressure Boundary
	Pressure Boundary
Level Glasses	Pressure Boundary
Mufflers and Silencers	Pressure Boundary
Orifices	Flow Restriction, Pressure Boundary
Piping and Fittings	Pressure Boundary
Pumps	NSR Functional Support
	Pressure Boundary
Tanks	NSR Functional Support
	Pressure Boundary
Valves	NSR Functional Support
	Pressure Boundary

2.3.3.A.9 NMP1 FIRE DETECTION AND PROTECTION SYSTEM

System Description

The NMP1 Fire Detection and Protection System is designed to achieve the following objectives:

- Provide automatic fire detection in those areas where the danger of fire exists.
- Provide fire extinguishment by fixed equipment activated automatically or manually for those areas where the danger of fire exists.
- Provide manually-operated fire extinguishing equipment for use by station personnel at points throughout the property and station.
- Provide a backup cooling water source for the reactor emergency cooling system in the event of a complete loss of all other sources of condensing water.
- Provide an emergency source of water for containment and reactor vessel flooding.
- Provide an emergency source of water to the spent fuel storage pool (hose).
- Provide a backup water source for the emergency service water system.
- Provide an emergency cooling water supply to either diesel generator.

These objectives are accomplished by the following systems.

The Fire Detection and Control System provides for the identification of a fire, annunciation locally and in the Control Room, and in certain zones, automatically initiates suppression. This system is comprised of 16 local fire alarm control panels, one main fire alarm control panel, detectors and associated circuitry.

The Fire Water System provides for the extinguishment of fires using water. Water is supplied throughout the station via the fire main loop which consists of the outside underground piping and an aboveground fire main transversing the Turbine Building. Two main fire pumps (one electric and one diesel-driven) and two jockey pumps maintain the system pressure. Water to suppress a fire is delivered by either an automatic sprinkler system or manual hose station.

The Halon Suppression System provides for the extinguishment of fires using Halon 1301. A total-flooding Halon system is used to protect the auxiliary control room, emergency cooling isolation valve room, administration building telephone equipment areas, Radwaste Solidification and Storage Building (RSSB) control room, RSSB electrical equipment room, and security equipment areas. The supply for these areas is provided by cylinder assemblies located near the protected area.

The Carbon Dioxide Suppression System provides for the extinguishment of fires using carbon dioxide. Total-flooding and local application carbon dioxide systems are installed to protect several different hazards in the station. The areas protected are the turbine oil tank room, reactor recirculation motor generator sets, powerboards 102 and 103, diesel generators 102 and 103, hydrogen seal oil enclosure, turbine oil reservoir room, cable spreading room, generator exciter housing, turbine generator bearings, turbine oil tanks and auxiliary control room (backup to Halon). The Carbon Dioxide System supports the main generator and is evaluated in the Main Generator and Auxiliary System (Section 2.3.4.A.4).

Portable fire extinguishers are also provided throughout the station to provide additional protection.

This system is in scope for license renewal for the following reasons:

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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) and station blackout (10 CFR 50.63).

The components subject to an AMR include the: fire header pressure maintenance pumps; motor driven fire pump and its motor cooler; the diesel driven fire pump, its diesel cooler, its diesel air start system (to the interface with Instrument Air), and its diesel fuel oil supply piping to its interface with the Diesel Fuel Oil System; the cross-connect from NMP2 to the pump discharge header; the connecting fire water supply piping and valves from the pump discharge header to the Reactor Building, and Turbine Building fire zones [excluding supplies to non-critical areas, (e.g., storage areas, changing rooms, locker rooms)]; make-up to the emergency cooling storage tank; and the back-up water supply to the spool piece connection with the emergency service water pump discharge header. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Radwaste Solidification and Storage Building, Reactor Building, Screen and Pump House Building, Turbine Building, and Waste Disposal Building.

USAR Reference(s)

More information about the Fire Detection and Protection System can be found in USAR Sections X.10A and X.10B.

License Renewal Drawing(s)

Components requiring an AMR for the Fire Detection and Protection System are highlighted on the following drawings:

- LR-18022-C, Sheet 1, Revision 0, Service Water, Reactor & Turbine Bldgs.
- LR-18026-C, Sheet 2, Revision 0, Emergency Diesel Generator #103, Starting Air, Cooling Water, Lube Oil & Fuel
- LR-18030-C, Sheet 2, Revision 0, Fire Protection Foam & Spray Water
- LR-18030-C, Sheet 3, Revision 0, Fire Protection, Water System
- LR-18030-C, Sheet 4, Revision 0, Fire Protection, Water System
- LR-18030-C, Sheet 5, Revision 0, Fire Protection, Water System
- LR-18030-C, Sheet 6, Revision 0, Fire Protection, Water System
- LR-18030-C, Sheet 7, Revision 0, Fire Protection, Water System
- LR-18030-C, Sheet 8, Revision 0, Fire Protection, Water System
- LR-18030-C, Sheet 9, Revision 0, Fire Protection, Water System
- LR-18036-C, Revision 0, Sealing Water for Turbine Building, Waste Building, Reactor Building, and Screen House
- LR-18040-C, Sheet 2, Revision 0, Fuel Oil Handling System, For Emergency Diesel Fire Pump

- LR-45094-C, Revision 0, Fire Protection, Halon
- LR-69030-C, Sheet 2, Revision 0, Fire Protection (Water) Hdr Pressure Screen House EL. 256'-0" Instrument Diagram

Components Subject to an AMR

The component types requiring an AMR for the Fire Detection and Protection System and their intended functions are shown in Table 2.3.3.A.9-1. The AMR results for these component types are provided in Table 3.3.2.A-8.

Table 2.3.3.A.9-1
NMP1 Fire Detection and Protection System

Component Type	Intended Functions
Bolting	NSR Functional Support
Filters/Strainers	NSR Functional Support
Fire Hydrants	NSR Functional Support
Flow Elements	NSR Functional Support
Gearbox	NSR Functional Support
Heat Exchangers	NSR Functional Support
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Orifices	NSR Functional Support
Piping and Fittings	NSR Functional Support
Pumps	NSR Functional Support
Silencers	NSR Functional Support
Sluice Gate for Motor Driven Fire Pump	NSR Functional Support
Spray Nozzles	NSR Functional Support
Sprinklers	NSR Functional Support
Tanks and Air Receivers	NSR Functional Support
Valves	NSR Functional Support
	Pressure Boundary

2.3.3.A.10 NMP1 HYDROGEN WATER CHEMISTRY SYSTEM

System Description

The NMP1 Hydrogen Water Chemistry and Noble Metal Chemical Addition Systems are designed to mitigate intergranular stress corrosion cracking of the reactor recirculation piping and the RPV internals. The Hydrogen Water Chemistry System injects hydrogen into the Feedwater/HPCI System to suppress the radiolytic generated oxidant concentration in the reactor core regions. This significantly reduces the electrochemical potential of the reactor components and greatly reduces crack initiation and growth. Oxygen is then injected into the Off-Gas System to maintain the stoichiometric mixture of hydrogen and oxygen in the recombiner. The Noble Metal Chemical Addition System includes permanent monitoring equipment as well as connections for periodically injecting a noble metal solution.

The Hydrogen Water Chemistry System does not perform any intended functions for license renewal purposes and, therefore, is not described further. The monitoring portion of the Noble Metal Chemical Injection System does, however, perform an intended function. The monitoring portion draws a sample from the Reactor Water Cleanup System, analyzes the effectiveness of the noble metal treatment in the durability monitor, and returns the sample to the Reactor Water Cleanup System. This system consists of tubing, valves, durability monitor and associated instruments and controls.

This system is in scope for license renewal for the following reason:

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components subject to an AMR include the NSR piping, fittings, and equipment containing liquid in the Reactor Building.

USAR Reference(s)

More information about the Hydrogen Water Chemistry System can be found in USAR Section X.M.

License Renewal Drawings

None (the only components that are subject to an AMR are NSR piping, fittings, and equipment containing liquid, which are not shown on any license renewal drawings).

Components Subject to an AMR

The component types requiring an AMR for the Hydrogen Water Chemistry System and their intended functions are shown in Table 2.3.3.A.10-1. The AMR results for these component types are provided in Table 3.3.2.A-9.

Table 2.3.3.A.10-1
NMP1 Hydrogen Water Chemistry System

Component Type	Intended Functions
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment

2.3.3.A.11 NMP1 LIQUID POISON SYSTEM

System Description

The NMP1 Liquid Poison System is a standby, redundant, independent control system that is designed to bring the reactor to a cold shutdown condition in the unlikely event that the control rod system fails to shut down and hold the reactor subcritical as the reactor cools and xenon decays.

The Liquid Poison System consists of an ambient pressure tank with immersion heater for low-temperature sodium pentaborate solution storage, two high-pressure positive displacement pumps for injecting the solution into the reactor core, two explosive actuated shear plug valves for isolating the liquid poison from the RPV until required, an in-vessel sparger ring, a test tank, two reactor coolant isolation check valves, pressure relief valves and associated piping, valves, instrumentation and controls.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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), and anticipated transients without scram (10 CFR 50.62).

The components subject to an AMR include the liquid poison tank, the liquid poison accumulators, liquid poison pumps, and the connecting piping and valves.

USAR Reference(s)

More information about the Liquid Poison System can be found in USAR Section VII.C.

License Renewal Drawing(s)

Components requiring an AMR for the Liquid Poison System are highlighted on the following drawing:

- LR-18019-C, Revision 0, Reactor Liquid Poison System

Components Subject to an AMR

The component types requiring an AMR for the Liquid Poison System and their intended functions are shown in Table 2.3.3.A.11-1. The AMR results for these component types are provided in Table 3.3.2.A-10.

Table 2.3.3.A.11-1
NMP1 Liquid Poison System

Component Type	Intended Functions
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Tanks	Pressure Boundary
Valves	Pressure Boundary

2.3.3.A.12 NMP1 MISCELLANEOUS NON-CONTAMINATED VENTS AND DRAINS SYSTEM

System Description

The NMP1 Miscellaneous Non-Contaminated Vents and Drains System is designed to route the non-contaminated effluents to floor drains, building sumps, the discharge tunnel, and the turbine building equipment drain tank. This system consists of vents, drains, and leak-off equipment from various non-contaminated sources including the Feedwater/High Pressure Coolant Injection (FW/HPCI) System (Section 2.3.4.A.3), Compressed Air Systems (Section 2.3.3.A.4), and the Makeup and Demineralizer System (not in scope for license renewal).

This system is in scope for license renewal for the following reason:

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components subject to an AMR for this system include the NSR piping, fittings, and equipment containing liquid in the Turbine Building and the Screen and Pump House Building.

USAR Reference(s)

More information about the Miscellaneous Non-Contaminated Vents and Drains System can be found in USAR Section XII.A.2.2.

License Renewal Drawing(s)

None (the only components that are subject to an AMR are NSR piping, fittings, and equipment containing liquid, which are not shown on any license renewal drawings).

Components Subject to an AMR

The component types requiring an AMR for the Miscellaneous Non-Contaminated Vents and Drains System and their intended functions are shown in Table 2.3.3.A.12-1. The AMR results for these component types are provided in Table 3.3.2.A-11.

Table 2.3.3.A.12-1
NMP1 Miscellaneous Non-Contaminated Vents and Drains System

Component Type	Intended Functions
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment

2.3.3.A.13 NMP1 NEUTRON MONITORING SYSTEM

System Description

The NMP1 Neutron Monitoring System is designed to provide neutron flux level monitoring of the reactor in three separate ranges. These include Source Range Monitoring, Intermediate Range Monitoring, and Power Range Monitoring. This system also includes the capability to calibrate the local power range monitors during normal operation. The Neutron Monitoring System is used to monitor and aid the operator in controlling the reactor from startup through full power.

The Source Range Monitoring and Intermediate Range Monitoring Systems are equipped with mechanically retractable detector assemblies which allow the operator to insert the detectors into the reactor core, and then retract the detectors to a low neutron flux region below the core when the proper point in reactor operation is reached. The Local Power Range Monitoring detectors are installed at fixed locations in the reactor core. The Average Power Range Monitoring system utilizes the signals from the Local Power Range Monitoring detectors to provide average power range signals for monitoring. These systems contain all electrical components.

The Neutron Monitoring System also includes the Traversing In-core Probe System which provides the capability to calibrate the local power range monitors during normal operation. The Traversing In-core Probe system consists of four identical trains, each containing ionization chamber detectors, indexing mechanism, ball valve, shear valve, chamber shield, drive mechanism and drive control unit. The drive mechanism drives the Traversing In-core Probe detector through the ball and shear valves and indexing mechanism into calibration tubes and then guide tubes located in the reactor core. The ball and shear valves function as reactor coolant isolation valves if a leak were to occur in a calibration or guide tube. The drive mechanisms, indexer mechanisms and calibration and guide tubes are continuously purged with nitrogen gas.

This system is in scope for license renewal for the following reason:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

The components subject to an AMR include the four Traversing In-core Probe system ball valves and their associated guide tubes from the shear valves to the containment penetration. The dry tubes for Source Range Monitoring and Intermediate Range Monitoring detectors are not included in the system boundary. The dry tubes are included in the RPV Internals (Section 2.3.1.A.2).

USAR Reference(s)

More information about the Neutron Monitoring System can be found in USAR Section VIII.C.

License Renewal Drawing(s)

Components requiring an AMR for the Neutron Monitoring System are highlighted on the following drawing:

- LR-18014-C, Sheet 2, Revision 0, Drywell & Torus Leak Rate & Anal, T.I.P. Sys. Electrical Pen & N2 Supply

Components Subject to an AMR

The component types requiring an AMR for the Neutron Monitoring System and their intended functions are shown in Table 2.3.3.A.13-1. The AMR results for these component types are provided in Table 3.3.2.A-12.

Table 2.3.3.A.13-1
NMP1 Neutron Monitoring System

Component Type	Intended Functions
Piping	Pressure Boundary
Valves	Pressure Boundary

2.3.3.A.14 NMP1 PROCESS RADIATION MONITORING SYSTEM

System Description

The NMP1 Process Radiation Monitoring System is designed to monitor radiation levels of liquid and gaseous processes throughout the plant, assist in controlling the release of radioactive byproducts, and provide for personnel safety by warning of abnormal radiation levels.

The Process Radiation Monitoring System consists of the following independent subsystems: Main Steam Line Radiation Monitoring, Air-ejector Off-Gas Radiation Monitoring, Stack Effluent Radiation Monitoring, Process Liquid Radiation Monitoring, Reactor Building Ventilation Radiation Monitoring, Emergency Cooling Condenser Vent Monitor, and Refueling Bridge High Radiation Monitor. Each of these subsystems consists of an appropriate detector and monitor and provide readouts, alarms and computer points to aide the operator. Only the Off-Gas stack effluent and process liquid radiation monitors draw a sample from their respective process streams. The remaining subsystems measure radiation levels directly on the process piping or local area.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49).

USAR Reference(s)

More information about the Process Radiation Monitoring System can be found in USAR Section VIII.C.3.

License Renewal Drawing(s)

None (see Components Subject to an AMR below)

Components Subject to an AMR

The in-scope components for the Process Radiation Monitoring System are active components. Therefore, there are no components requiring an AMR for the Process Radiation Monitoring System.

2.3.3.A.15 NMP1 RADIOACTIVE WASTE DISPOSAL BUILDING HVAC SYSTEM

System Description

The NMP1 Radioactive Waste Disposal Building HVAC System provides heating and ventilation for personnel comfort, equipment protection and for controlling possible radioactivity release to the atmosphere.

The Radioactive Waste Disposal Building HVAC System consists of filters, fans, dampers and associated ductwork, instrumentation and controls. Air is drawn into the system through an inlet louver, filter and heater by two supply fans and distributed throughout the Waste Building and Waste Building Extension. An air outlet is located in each room and at each piece of equipment where radioactive contamination could be released. The exhaust ductwork leads to two trains of inlet and outlet dampers, roughing and high efficiency filters, and exhaust fans. Two smaller exhaust fans provide the discharge path for specific areas within the Waste Disposal Building. The Waste Disposal Building Extension also has two separate trains of dampers, filters and fans. The discharge from all of the exhaust fans travels through one of three backdraft dampers and exits the station through the vent stack.

This system is in scope for license renewal for the following reason:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

The components subject to an AMR are the system backdraft dampers to the Vent Stack.

USAR Reference(s)

More information about the Radioactive Waste Disposal Building HVAC System can be found in USAR Section III.C.1.4.

License Renewal Drawing(s)

Components requiring an AMR for the Radioactive Waste Disposal Building HVAC System are highlighted on the following drawings:

- LR-18028-C, Sheet 1, Revision 0, Waste Disposal Building, Heating & Ventilation System

Components Subject to an AMR

The component types requiring an AMR for the Radioactive Waste Disposal Building HVAC System and their intended functions are shown in Table

2.3.3.A.15-1. The AMR results for these component types are provided in Table 3.3.2.A-13.

Table 2.3.3.A.15-1
NMP1 Radioactive Waste Disposal Building HVAC System

Component Type	Intended Functions
Dampers	Pressure Boundary

2.3.3.A.16 NMP1 RADIOACTIVE WASTE SYSTEM

System Description

The NMP1 Radioactive Waste System is designed to meet the following objectives:

- Collect and process all radioactive waste generated without limiting normal Station operation;
- Collect and process radioactive wastes for disposal, or transfer to a vendor for processing and disposal;
- Release radioactive material to the environment in a controlled manner so that all releases are within the limits of 10 CFR 20 and the Technical Specifications; and
- Retain radioactive wastes, if they accidentally leak from the systems, so that they can be recovered and reprocessed.

The Radioactive Waste System consists of the Gaseous Waste System, Liquid Waste System, and Solid Waste System. Further information on these systems is provided below.

Gaseous radioactive wastes include airborne particulates as well as gases vented from process equipment. Sources of gaseous waste activity are the offgas system effluent, steam-packing exhauster system effluent, and building ventilation exhausts. The systems that comprise the Gaseous Waste are described in further detail in the referenced sections:

- Offgas System (Section 2.3.4.A.2)
- Steam-packing Exhauster System [see the Condenser Air Removal and Off-Gas System, (Section 2.3.4.A.2)]

- Turbine Building HVAC System (Section 2.3.3.A.26)
- Reactor Building HVAC System (Section 2.3.3.A.18)
- Vent Stack (Section 2.4.A.11)
- Radioactive Waste Disposal Building HVAC System (Section 2.3.3.A.15)

The Liquid Waste System processes the liquids collected in equipment drains and floor drains in areas that are potentially contaminated with radioactive materials these liquids. The wastes are collected in the floor drain sumps located within the drywell, the Reactor Building, the Turbine Building, the Radioactive Waste Solidification and Storage Building, the Offgas Building, and the Waste Disposal Building. The wastes in these floor drain sumps are pumped into the floor drain collector, waste neutralizer tank, or utility collector tank, which are located in the Waste Disposal Building.

The Solid Waste System processes spent resins, filter sludge, and concentrated waste. It also is designed for collection and shipment of low-level solids. Wastes may be processed or solidified onsite, or transferred to a vendor for processing.

The Radioactive Waste System is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49).

The components subject to an AMR are the drywell equipment drain tanks, the Reactor Building equipment drain tank, the drywell equipment drain pumps, the Reactor Building equipment drain pump, and the piping and associated isolation valves upstream of the tanks for the in-scope drains going to the tanks. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Reactor Building, Radwaste Solidification and Storage Building, Turbine Building, and Waste Disposal Building.

USAR Reference(s)

More information about the Radioactive Waste System can be found in USAR Section XII.A.

License Renewal Drawing(s)

Components requiring an AMR for the Radioactive Waste System are highlighted on the following drawings:

- LR-18006-C, Sheet 3, Revision 0, Drywell and Torus Isolation Valves (P&ID)
- LR-18008-C, Revision 0, Spent Fuel Storage Pool, Filtering and Cooling System
- LR-18018-C, Sheet 1, Revision 0, Reactor Shutdown Cooling
- LR-18045-C, Sheet 7, Revision 0, Waste Disposal System
- LR-18045-C, Sheet 7A, Revision 0, Waste Disposal System
- LR-18045-C, Sheet 9, Revision 0, Waste Disposal System
- LR-69014-C, Sheet 1, Revision 0, Drywell Press & LvL, West Instrument Room El. 284'-0" (P&ID)
- LR-69014-C, Sheet 2, Revision 0, Drywell Press & Lvl, East Instrument Room El. 284' - 0"
- LR-69015-C, Sheet 1, Revision 0, Reactor Vessel Level, East Inst. Room El. 284'-0" (P&ID)
- LR-69015-C, Sheet 2, Revision 0, Reactor Vessel Level, West Inst. Room R.B. El. 284'-0" (P&ID)
- LR-69015-C, Sheet 3, Revision 0, Reactor Vessel Level, (Wide Range) & Pressure, West Inst. Room R.B. El. 284'-0"
- LR-69015-C, Sheet 4, Revision 0, RV Level & Pressure West Inst. Room (P&ID)
- LR-69015-C, Sheet 5, Revision 0, RV Level & Pressure East Inst. Room (P&ID)

- LR-69015-C, Sheet 6, Revision 0, RV Level and Core dP Lower Inst. Room (P&ID)
- LR-69017-C, Sheet 2, Revision 0, Emergency Condenser #11 Steam Flow, East Instrumentation Room, El. 284'-0" Reactor Building
- LR-69017-C, Sheet 3, Revision 0, Emergency Condenser #12 Steam Flow, West Instrumentation Room, El. 284'-0" Reactor Building
- LR-69020-C, Sheet 1, Revision 0, Reactor Recirc. Loop #11 Recirc. Flow, Instrument Room R.B. El. 237'-0" (P&ID)
- LR-69020-C, Sheet 2, Revision 0, Reactor Recirc. Loop #12 Recirc. Flow, Instrument Room R.B. El. 237'-0" (P&ID)
- LR-69020-C, Sheet 3, Revision 0, Reactor Recirc. Loop #13 Recirc. Flow, Instrument Room R.B. El. 237'-0" (P&ID)
- LR-69020-C, Sheet 4, Revision 0, Reactor Recirc. Loop #14 Recirc. Flow, Instrument Room R.B. El. 237'-0" (P&ID)
- LR-69020-C, Sheet 5, Revision 0, Reactor Recirc. Loop #15 Recirc. Flow, Instrument Room R.B. El. 237'-0" (P&ID)
- LR-69020-C, Sheet 6, Revision 0, Reactor Recirc. Pump #11 Seal Press, Lower Inst. Room R.B. El. 237' (P&ID)
- LR-69020-C, Sheet 7, Revision 0, Reactor Recirc. Pump #12 Seal Press, Lower Inst. Room R.B. El. 237' (P&ID)
- LR-69020-C, Sheet 8, Revision 0, Reactor Recirc. Pump #13 Seal Press, Lower Inst. Room R.B. El. 237' (P&ID)
- LR-69020-C, Sheet 9, Revision 0, Reactor Recirc. Pump #14 Seal Press, Lower Inst. Room R.B. El. 237' (P&ID)
- LR-69020-C, Sheet 10, Revision 0, Reactor Recirc. Pump #15 Seal Press, Lower Inst. Room R.B. El. 237' (P&ID)
- LR-69020-C, Sheet 11, Revision 0, Rx Recirc. Loop #11 Pump Diff. Press, Instrument Room R.B. El. 237'-0" (P&ID)
- LR-69020-C, Sheet 12, Revision 0, Rx Recirc. Loop #12 Pump Diff. Press, Instrument Room R.B. El. 237'-0" (P&ID)

- LR-69020-C, Sheet 13, Revision 0, Rx Recirc. Loop #13 Pump Diff. Press, Instrument Room R.B. El. 237'-0" (P&ID)
- LR-69020-C, Sheet 14, Revision 0, Rx Recirc. Loop #14 Pump Diff. Press, Instrument Room R.B. El. 237'-0" (P&ID)
- LR-69020-C, Sheet 15, Revision 0, Rx Recirc. Loop #15 Pump Diff. Press, Instrument Room R.B. El. 237'-0" (P&ID)

Components Subject to an AMR

The component types requiring an AMR for the Radioactive Waste System and their intended functions are shown in Table 2.3.3.A.16-1. The AMR results for these component types are provided in Table 3.3.2.A-14.

Table 2.3.3.A.16-1
NMP1 Radioactive Waste System

Component Type	Intended Functions
Bolting	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Pumps	NSR Functional Support
Tanks	Pressure Boundary
Valves	Pressure Boundary

2.3.3.A.17 NMP1 REACTOR BUILDING CLOSED LOOP COOLING WATER SYSTEM

System Description

The NMP1 Reactor Building Closed Loop Cooling (RBCLC) Water System is designed to provide demineralized water to cool reactor auxiliary equipment located in the Primary Containment, Reactor Building, Turbine Building, and Waste Disposal Building. The closed loop permits isolation of systems containing radioactive liquids from the service water.

The RBCLC Water System consists of three redundant pumps, three redundant heat exchangers, flow control valves and associated piping, valves, instrumentation and controls. The pumps take suction from a common header and discharge to a common manifold where flow is routed to the heat exchangers. The cooling water is then piped to the various equipment loads, such as heat exchangers, coolers and condensers. The flow is then returned to the suction side of the pumps, thereby completing the closed loop. The RBCLC heat exchangers are cooled by the Service Water System (Section 2.3.3.A.21). Low-conductivity water can be added to the system from the closed loop cooling makeup tank.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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) and environmental qualification (10 CFR 50.49).

The components subject to an AMR include the RBCLC pumps; Reactor Building Closed Loop Cooling heat exchangers; their interconnecting piping, flow components, and valves (including those to the closed cooling water make-up tank); and the piping and valves associated with the following system cooling loads:

- Reactor Recirculation pumps and motor coolers
- Spent Fuel Pool heat exchangers
- Non-regenerative heat exchanger

- Instrument Air compressor coolers and aftercoolers
- Containment (drywell) unit coolers
- Shutdown Cooling heat exchangers
- Shutdown Cooling pump coolers
- Drywell equipment drain tank coolers
- Reactor Building equipment drain tank cooler
- Reactor Water Cleanup demineralizer; non-regenerative heat exchanger; regenerative heat exchanger and reactor vessel sample coolers
- Waste Evaporator coolers
- Control Room HVAC chiller condenser coolers
- Condensate pump coolers
- Reactor feedwater pump jacket and lube oil coolers
- Reactor feedwater booster pump coolers
- Clean-up filter precoat cooler
- Clean-up sludge tank blower aftercooler
- Auxiliary clean-up pump bearing, oil, and pedestal coolers

The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Reactor Building, Radwaste Solidification and Storage Building, and Waste Disposal Building.

USAR Reference(s)

More information about the RBCLC Water System can be found in USAR Section X.D.

License Renewal Drawing(s)

Components requiring an AMR for the RBCLC Water System are highlighted on the following drawings:

- LR-18006-C, Sheet 3, Revision 0, Drywell and Torus, Isolation Valves
- LR-18008-C, Revision 0, Spent Fuel Storage Pool, Filtering and Cooling System
- LR-18009-C, Sheet 1, Revision 0, Reactor Clean-Up System
- LR-18009-C, Sheet 2, Revision 0, Reactor Clean-Up System
- LR-18011-C, Sheet 2, Revision 0, Instrument Air System
- LR-18014-C, Sheet 1, Revision 0, Reactor Containment (Drywell & Torus) Inert Gas (N2) Purge and Fill, Drywell Cooling System
- LR-18018-C, Sheet 1, Revision 0, Reactor Shutdown Cooling
- LR-18018-C, Sheet 2, Revision 0, Reactor Shutdown Cooling
- LR-18020-C, Revision 0, Reactor Recirculation Loops, (Typical of 5)
- LR-18022-C, Sheet 2, Revision 0, Reactor Bldg., Closed Loop Cooling System
- LR-18022-C, Sheet 3, Revision 0, Turbine Building Closed Loop Cooling System
- LR-18041-C, Sheet 2, Revision 0, Sampling Points, Liquids-Shutdown Cooling, Fuel Pool Clean-Up & Liquid Poison Systems
- LR-18041-C, Sheet 7, Revision 0, Sampling Points, Reactor Vessel, Post Accident
- LR-18045-C, Sheet 7, Revision 0, Waste Disposal System
- LR-18047-C, Revision 0, Control Room, Heating Ventilating & Air Conditioning System

Components Subject to an AMR

The component types requiring an AMR for the RBCLC Water System and their intended functions are shown in Table 2.3.3.A.17-1. The AMR results for these component types are provided in Table 3.3.2.A-15.

Table 2.3.3.A.17-1
NMP1 Reactor Building Closed Loop Cooling Water System

Component Type	Intended Functions
Filters/Strainers	Filtration, Pressure Boundary
Flow Elements	Pressure Boundary
Heat Exchangers	Heat Transfer, Pressure Boundary
	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Orifices	Flow Restriction, Pressure Boundary
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Temperature Elements	Pressure Boundary
Valves	Pressure Boundary

2.3.3.A.18 NMP1 REACTOR BUILDING HVAC SYSTEM

System Description

The NMP1 Reactor Building HVAC System is designed to control the Reactor Building atmosphere within limits during normal and emergency operating conditions. Additionally, the system is an alternative system for venting the primary containment to the atmosphere, if necessary. The Reactor Building HVAC System consists of the Reactor Building Normal Ventilation System and the Reactor Building Emergency Ventilation System. Further information on these systems is provided below.

The Reactor Building Normal Ventilation System provides clean fresh air to the Reactor Building, removes air from areas where excessive heat concentration and potential airborne contamination exist, and maintains a negative pressure in the Reactor Building relative to the atmosphere by regulating the amount of outside air introduced into the building. The clean air is required to remove air from areas where excessive heat concentration exists. Normal ventilation supply is accomplished by fans that take air from the outside atmosphere and supply it to the Reactor Building, and exhaust non-contaminated air from the Reactor Building to the atmosphere through the stack. The normal ventilation system automatically isolates upon initiation of the emergency ventilation system.

The Reactor Building Emergency Ventilation System removes air from areas where excessive heat concentration and potential airborne contamination exists, maintains a negative pressure in the Reactor Building relative to atmosphere, and removes and filters contaminated air during accident conditions. The Reactor Building Emergency Ventilation System is a standby system consisting of redundant filter trains, which operates in the event of an accident or normal ventilation failure. Emergency ventilation is accomplished by fans that exhaust air from the Reactor Building through a filter bank to the atmosphere through the stack. This system can also be used to process the drywell and torus atmospheres when venting.

The Reactor Building HVAC system is in scope for license renewal for the following reasons:

- It performs a safety-related function(s) per 10 CFR 54.4(a)(1).
- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49).

The components subject to an AMR include the inlet and exhaust dampers and exhaust ductwork of the Reactor Building Normal Ventilation System and the entire Reactor Building Emergency Ventilation System.

USAR Reference(s)

More information about the Reactor Building HVAC System can be found in USAR Sections VI.E.2 and VII.H.

License Renewal Drawing(s)

Components requiring an AMR for the Reactor Building HVAC System are highlighted on the following drawings:

- LR-18013-C, Sheet 0, Revision 0, Reactor Building Heating Cooling and Ventilating System P&ID

- LR-69013-C, Sheet 1, Revision 0, Reactor Building Emergency Vent Flow Turbine Building Elevation 302'-8" Instrument Diagram
- LR-69013-C, Sheet 2, Revision 0, Reactor Building Emergency Vent. System Turbine Building Elevation 261'-0" Instrument Diagram

Components Subject to an AMR

The component types requiring an AMR for the Reactor Building HVAC System and their intended functions are shown in Table 2.3.3.A.18-1. The AMR results for these component types are provided in Table 3.3.2.A-16.

Table 2.3.3.A.18-1
NMP1 Reactor Building HVAC System

Component Type	Intended Functions
Blowers	Pressure Boundary
Bolting	Pressure Boundary
Ducting	Pressure Boundary
Filters	Filtration, Pressure Boundary
Flow Elements	Pressure Boundary
Piping and Fittings	Pressure Boundary
Temperature Elements	Pressure Boundary
Valves and Dampers	Pressure Boundary

2.3.3.A.19 NMP1 REACTOR WATER CLEANUP SYSTEM

System Description

The NMP1 Reactor Water Cleanup System is designed to maintain high reactor water purity in order to: minimize deposits on fuel clad surfaces by reducing the amount of water-borne impurities in the primary system; and reduce the secondary sources of beta and gamma radiation resulting from the deposition of corrosion products, fission products, and impurities in the primary system.

The Reactor Water Cleanup System continuously purifies a portion of the reactor recirculation flow and reactor bottom head drain flow with a minimum of heat loss from the cycle. Water is normally removed at reactor pressure from one of the reactor recirculation loops and the reactor bottom head drain line, cooled in regenerative and nonregenerative heat exchangers, reduced in pressure, filtered, demineralized, and pumped through the shellside of the regenerative heat exchanger to the RPV through the FW/HPCI System (Section 2.3.4.A.3). Whenever reactor pressure is insufficient to maintain suction pressure at the main cleanup pumps, an auxiliary pump is used.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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) and environmental qualification (10 CFR 50.49).

The components subject to an AMR include the piping and valves from the containment isolation valves inboard to the system connections with Reactor Recirculation Loop A and the Feedwater System; the piping and valves from the relief valve to the inboard-most containment isolation valve outside of containment for the system relief valve downstream of the pressure control valve after the non-regenerative heat exchanger; and the RBCLC pressure boundaries of the non-regenerative heat exchanger. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Reactor Building.

USAR Reference(s)

More information about the Reactor Water Cleanup System can be found in USAR Section X.B.

License Renewal Drawing(s)

Components requiring an AMR for the Reactor Water Cleanup System are highlighted on the following drawings:

- LR-18002-C, Sheet 1, Revision 0, Steam Flow, Main Steam & High Press. Turbine
- LR-18006-C, Sheet 1, Revision 0, Drywell & Torus, Isolation & Blocking Valves

- LR-18006-C, Sheet 2, Revision 0, Drywell & Torus, Isolation Valves
- LR-18009-C, Sheet 1, Revision 0, Reactor Clean-Up System
- LR-18009-C, Sheet 2, Revision 0, Reactor Clean-Up System

Components Subject to an AMR

The component types requiring an AMR for the Reactor Water Cleanup System and their intended functions are shown in Table 2.3.3.A.19-1. The AMR results for these component types are provided in Table 3.3.2.A-17.

Table 2.3.3.A.19-1
NMP1 Reactor Water Cleanup System

Component Type	Intended Functions
Bolting	Pressure Boundary
Heat Exchangers	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Valves	Pressure Boundary

2.3.3.A.20 NMP1 SAMPLING SYSTEM

System Description

The NMP1 Sampling System provides for the sampling of liquid, steam and gases from various systems in the plant under all operating modes.

The Sampling System consists of pumps, coolers and associated piping (including tubing), valves, instrumentation and controls. Liquid samples can be obtained from the RPV, Spent Fuel Pool, Reactor Water Cleanup, Core Spray, Torus, Liquid Poison, Condensate, Feedwater, RBCLC, Turbine Building Closed Loop Cooling, Circulating Water, Radioactive Waste Disposal and Make-up Systems. Steam samples from the Main Steam System are obtainable. Gaseous samples can be obtained from Primary Containment, Vent Stack and Off Gas Systems.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), and station blackout (10 CFR 50.63).

The components subject to an AMR include the sample coolers, the blocking valves for RBCLC samples from the Shutdown Cooling heat exchangers and the Non-Regenerative heat exchanger, the blocking valves for the RPV sample containment penetration and its associated rupture disc, and the Post-Accident Sampling System reactor core sample isolation valve. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Reactor Building, Radwaste Solidification and Storage Building, Screen and Pump House Building, Turbine Building, and Waste Disposal Building.

USAR Reference(s)

More information about the Sampling System can be found in USAR Section VIII.C.3.

License Renewal Drawing(s)

Components requiring an AMR for the Sampling System are highlighted on the following drawings:

- LR-18041-C, Sheet 1, Revision 0, Sampling Points, Main Steam, Feedwater & Condensate
- LR-18041-C, Sheet 2, Revision 0, Sampling Points, Liquids-Shutdown Cooling, Fuel Pool Clean-Up & Liquid Poison Systems
- LR-18041-C, Sheet 7, Revision 0, Sampling Points, Reactor Vessel, Post Accident

Components Subject to an AMR

The component types requiring an AMR for the Sampling System and their intended functions are shown in Table 2.3.3.A.20-1. The AMR results for these component types are provided in Table 3.3.2.A-18.

Table 2.3.3.A.20-1
NMP1 Sampling System

Component Type	Intended Functions
Heat Exchangers	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Rupture Disc	Pressure Boundary
Valves	Pressure Boundary

2.3.3.A.21 NMP1 SERVICE WATER SYSTEM

System Description

The NMP1 Service Water System is designed to provide a reliable supply of cooling water to various safety and non-safety related components and systems. Systems cooled by the Service Water System include the RBCLC Water System (Section 2.3.3.A.17), Turbine Building Closed Loop Cooling Water System (Section 2.3.3.A.25), Reactor Building HVAC System (Section 2.3.3.A.18), Turbine Building HVAC System (Section 2.3.3.A.26), and Radioactive Waste Disposal Building HVAC System (Section 2.3.3.A.15). Service Water also is supplied to the screenwash pumps, the Radwaste Solidification and Storage Building, and the makeup demineralizer.

The Service Water System consists of two service water pumps, two emergency service water pumps, strainers and associated piping, valves, instrumentation and controls. Under normal plant operation, the service water pumps take suction from the pump wells located in the Screen and Pump House Building (Section 2.4.A.9) and discharge cooling water through strainers into the service water headers. These headers route the water to the various loads cooled by the Service Water System. The water is then discharged into the discharge tunnel. In the event of a loss of offsite power, the service water requirements for the RBCLC heat exchangers (SR loads) would be met by the emergency service water pumps. These pumps take suction from independent pump wells and discharge only to the header supplying the RBCLC heat exchangers. The discharge line of one of the emergency service water pumps can be supplied, via a manually installed spool piece, by the diesel fire pump.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

- It contains SCs 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) and environmental qualification (10 CFR 50.49).

The components subject to an AMR are the emergency service water pumps, the supply and return piping for the RBCLC heat exchangers, and the supply piping to the containment drywell, inclusive of the applicable system valves. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Offgas Building, Reactor Building, Screen and Pump House Building, and Turbine Building.

USAR Reference(s)

More information about the Service Water System can be found in USAR Section X.F.

License Renewal Drawing(s)

Components requiring an AMR for the Service Water System are highlighted on the following drawings:

- LR-18006-C, Sheet 3, Revision 0, Drywell and Torus, Isolation Valves

- LR-18014-C, Sheet 4, Revision 0, Reactor Containment Drywell & Torus Inert Gas (N2) Supply No. 12

- LR-18022-C, Sheet 1, Revision 0, Service Water, Reactor & Turbine Bldgs.

Components Subject to an AMR

The component types requiring an AMR for the Service Water System and their intended functions are shown in Table 2.3.3.A.21-1. The AMR results for these component types are provided in Table 3.3.2.A-19.

Table 2.3.3.A.21-1
NMP1 Service Water System

Component Type	Intended Functions
Bolting	Pressure Boundary
Filters/Strainers	Pressure Boundary
Flow Elements	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Valves	NSR Functional Support
	Pressure Boundary

2.3.3.A.22 NMP1 SHUTDOWN COOLING SYSTEM

System Description

The NMP1 Shutdown Cooling System is designed to cool reactor water below temperatures and pressures at which the main condenser may be used as a heat sink following reactor shutdown. This system provides the capability to achieve and maintain a cold shutdown condition by removal of reactor fission product decay heat.

The Shutdown Cooling System consists of reactor coolant isolation valves, three redundant loops each having a pump, heat exchanger and flow control valve, and associated piping, valves, instrumentation and controls. Reactor water enters this system from the suction side of one of the reactor recirculation pumps, flows through the partial-capacity shutdown cooling system loops, then discharges into the discharge side of another recirculation loop pump. The heater exchangers are cooled by the RBCLC Water System (Section 2.3.3.A.17).

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

- It contains SCs 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) and environmental qualification (10 CFR 50.49).

The components subject to an AMR extend from the Reactor Recirculation System inlet to the Reactor Recirculation return including the shutdown cooling pumps (and their coolers), the Shutdown Cooling heat exchangers, and the inclusive piping, flow components, and valves. The components subject to an AMR for this system include the NSR piping, fittings, and equipment containing liquid in the Reactor Building.

USAR Reference(s)

More information about the Shutdown Cooling System can be found in USAR Section X.A.

License Renewal Drawing(s)

Components requiring an AMR for the Shutdown Cooling System are highlighted on the following drawings:

- LR-18006-C, Sheet 1, Revision 0, Drywell & Torus, Isolation Valves

- LR-18007-C, Sheet 2, Revision 0, Reactor Core Spray

- LR-18018-C, Sheet 1, Revision 0, Reactor Shutdown Cooling

- LR-18022-C, Sheet 2, Revision 0, Reactor Bldg., Closed Loop Cooling System

- LR-45136-C, Sheet 2B, Revision 0, Instrumentation, Valve Schedule

Components Subject to an AMR

The component types requiring an AMR for the Shutdown Cooling System and their intended functions are shown in Table 2.3.3.A.22-1. The AMR results for these component types are provided in Table 3.3.2.A-20.

Table 2.3.3.A.22-1
NMP1 Shutdown Cooling System

Component Type	Intended Functions
Flow Elements	NSR Functional Support
Heat Exchangers	Heat Transfer, Pressure Boundary
	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Orifices	Flow Restriction, Pressure Boundary
	NSR Functional Support
Piping and Fittings	Pressure Boundary
Pumps	NSR Functional Support
Valves	NSR Functional Support
	Pressure Boundary

2.3.3.A.23 NMP1 SPENT FUEL POOL FILTERING AND COOLING SYSTEM

System Description

The NMP1 Spent Fuel Pool Filtering and Cooling System is designed to remove decay heat from the spent fuel assemblies' and the impurities from the pool water. This system maintains the temperature and purity of the spent fuel pool water at acceptable levels

The Spent Fuel Pool Filtering and Cooling System pumps take suction from the skimmer surge tanks and circulate the pool water through two parallel loops, each consisting of a precoat type filter and a heat exchanger. The water is returned to the pool through diffusers. One circulation loop is adequate to handle the heat load imposed by the system during normal spent-fuel storage. The other circulation loop acts as a standby. Cooling water is supplied to the heat exchangers from the RBCLC Water System (Section 2.3.3.A.17). Makeup water to the spent fuel storage pool is provided by the Condensate and Condensate Transfer System (Section 2.3.4.A.1). The Spent Fuel Pool Filtering and Cooling System is also used after reactor refueling to drain the reactor internals storage pit and head cavity. Alternate lines allow transport of the water to either the main condenser or to the waste disposal system for processing.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49).

The components subject to an AMR include the Spent Fuel Pool surge tanks, the recirculating pumps and their suction strainers, the heat exchangers, the filters, the piping to and from the Spent Fuel Pool connecting these components, and the inclusive flow components and valves. The spent fuel pool itself is included as part of the Reactor Building structure. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Reactor Building.

USAR Reference(s)

More information about the Spent Fuel Pool Filtering and Cooling System can be found in USAR Section X.H.

License Renewal Drawing(s)

Components requiring an AMR for the Spent Fuel Pool Filtering and Cooling System are highlighted on the following drawings:

- LR-18008-C, Revision 0, Spent Fuel Storage Pool, Filtering and Cooling System
- LR-18041-C, Sheet 2, Revision 0, Sampling Points, Liquids-Shutdown Cooling, Fuel Pool Clean-Up & Liquid Poison Systems
- LR-45136-C, Sheet 8, Revision 0, Instrumentation, Valve Schedule

Components Subject to an AMR

The component types requiring an AMR for the Spent Fuel Pool Filtering and Cooling System and their intended functions are shown in Table 2.3.3.A.23-1. The AMR results for these component types are provided in Table 3.3.2.A-21.

Table 2.3.3.A.23-1
NMP1 Spent Fuel Pool Filtering and Cooling System

Component Type	Intended Functions
Filters/Strainers	Filtration, Pressure Boundary
Flow Elements	Pressure Boundary
Heat Exchangers	Heat Transfer, Pressure Boundary
	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Tanks	Pressure Boundary
Valves	Pressure Boundary

2.3.3.A.24 NMP1 TECHNICAL SUPPORT CENTER HVAC SYSTEM

System Description

The NMP1 Technical Support Center HVAC System is designed to maintain the Technical Support Center temperature and supply tempered, re-circulated, and outside air to maintain a suitable environment for emergency response personnel. The Technical Support Center HVAC System consists of supply, circulating, exhaust and smoke purge fans, various filters, electric heater, cooling coil and associated ductwork, dampers, instrumentation and controls. During the normal mode of operation, air is drawn into the system through a louvered intake, electric heater, filter and cooling coil to the circulating fan. This fan discharges air to the Technical Support Center. Air is exhausted through the exhaust fan to the environment. In the emergency mode, the normal mode flow path isolates and the supply fan draws air through a separate louvered intake. The air is then directed through a pre-filter, HEPA filter, charcoal filter and a second HEPA filter to the suction of the circulating fan. There is no direct exhaust path in the emergency mode as the Technical Support Center is maintained at a positive pressure. The HVAC system also has a separate exhaust path for the removal of smoke.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49).

USAR Reference(s)

More information about the Technical Support Center HVAC System can be found in USAR Section III.E.1.2.2.

License Renewal Drawing(s)

None (See Components Subject to an AMR below)

Components Subject to an AMR

The in-scope components for the Technical Support Center HVAC System are active components. Therefore, there are no components requiring an AMR for the Technical Support Center HVAC System.

2.3.3.A.25 NMP1 TURBINE BUILDING CLOSED LOOP COOLING WATER SYSTEM

System Description

The NMP1 Turbine Building Closed Loop Cooling (TBCLC) Water System provides demineralized water to cool various non-safety related auxiliary equipment in the Turbine Building in support of power generation. The closed loop provides isolation of systems containing radioactive liquids from the service water, which returns to the lake.

The TBCLC Water System consists of two redundant pumps, three half-capacity heat exchangers, three temperature-controlled flow control valves and associated piping, valves, instrumentation and controls. The flow path begins at the pumps where water is discharged through the flow control valves to the heat exchangers and on to the system loads. Water then returns to the suction of the TBCLC pumps. The heat exchangers are cooled by service water. Low-conductivity water can be added to the TBCLC System from the closed loop cooling makeup tank, which is shared with the RBCLC Water System (Section 2.3.3.A.17).

This system is in scope for license renewal for the following reason:

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components subject to an AMR for this system include the NSR piping, fittings, and equipment containing liquid in the Turbine Building.

USAR Reference(s)

More information about the TBCLC Water System can be found in USAR Section X.E.

License Renewal Drawing(s)

None (the only components that are subject to an AMR are NSR piping, fittings, and equipment containing liquid, which are not shown on any license renewal drawings).

Components Subject to an AMR

The component types requiring an AMR for the TBCLC Water System and their intended functions are shown in Table 2.3.3.A.25-1. The AMR results for these component types are provided in Table 3.3.2.A-22.

Table 2.3.3.A.25-1
NMP1 Turbine Building Closed Loop Cooling Water System

Component Type	Intended Functions
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment

2.3.3.A.26 NMP1 TURBINE BUILDING HVAC SYSTEM

System Description

The NMP1 Turbine Building HVAC System is designed to provide a continuous flow of fresh tempered air throughout the building, while maintaining a negative atmospheric pressure. This system also has heat and smoke removal capability for three smoke zones and the upper elevation of the Turbine Building.

The Turbine Building HVAC System consists of air intakes, filters, electric heating units, flow control dampers, dampers, and ductwork to distribute air to various areas in the Turbine Building. Outside air is taken in through louvered, screened penthouses, which supply air to the Turbine Building HVAC supply fans. The air then passes through filters and heating coils. Exhaust air is directed through a plenum to the stack for discharge and is monitored for radiation. The exhaust system discharges into the plenum, which also receives air from the containment and other buildings. The smoke removal function of the Turbine Building HVAC System consists of three independent air make-up fans, dampers and ductwork (one for each smoke zone) and automatic isolation dampers and exhaust fans of the normal ventilation system. In addition, there are twelve motor operated roof vents and five sidewall vents.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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).

The components subject to an AMR are the inlet dampers for the supply fans and the outlet dampers for the exhaust fans; smoke removal components including three independent air make-up fans (one for each smoke zone) and associated ductwork and dampers; and Turbine Building roof and sidewall vents.

USAR Reference(s)

More information about the Turbine Building HVAC System can be found in USAR Section III.A.2.2.

License Renewal Drawing(s)

Components requiring an AMR for the Turbine Building HVAC System are highlighted on the following drawings:

- LR-18010-C, Sheet 1, Revision 0, Main Condenser Air Removal & Off Gas System
- LR-18021-C, Sheet 1, Revision 0, Turbine Building Heating Cooling And Ventilating Systems P&ID
- LR-18021-C, Sheet 2, Revision 0, Turbine Building Heating Cooling And Ventilating Systems Air Conditioning Systems For Lab. Areas P&ID
- LR-18021-C, Sheet 3, Revision 0, Off-Gas Building, Ventilation Systems

Components Subject to an AMR

The component types requiring an AMR for the Turbine Building HVAC System and their intended functions are shown in Table 2.3.3.A.26-1. The AMR results for these component types are provided in Table 3.3.2.A-23.

Table 2.3.3.A.26-1
NMP1 Turbine Building HVAC System

Component Type	Intended Functions
Blowers	NSR Functional Support
Bolting	NSR Functional Support
	Pressure Boundary
Ducting	NSR Functional Support
	Pressure Boundary
Muffler	NSR Functional Support
Valves and Dampers	NSR Functional Support
	Pressure Boundary
Vents	NSR Functional Support

2.3.3.B NMP2 AUXILIARY SYSTEMS

NMP2 Auxiliary Systems are those systems used to support normal and emergency plant operations. The systems provide cooling, ventilation, sampling, and other required functions. The following systems are included in this subsection:

- NMP2 Air Startup - Standby Diesel Generator System (Section 2.3.3.B.1)
- NMP2 Alternate Decay Heat Removal System (Section 2.3.3.B.2)
- NMP2 Auxiliary Service Building HVAC System (Section 2.3.3.B.3)
- NMP2 Chilled Water Ventilation System (Section 2.3.3.B.4)
- NMP2 Compressed Air Systems (Section 2.3.3.B.5)
- NMP2 Containment Atmosphere Monitoring System (Section 2.3.3.B.6)
- NMP2 Containment Leakage Monitoring System (Section 2.3.3.B.7)
- NMP2 Control Building Chilled Water System (Section 2.3.3.B.8)
- NMP2 Control Building HVAC System (Section 2.3.3.B.9)
- NMP2 Diesel Generator Building Ventilation System (Section 2.3.3.B.10)
- NMP2 Domestic Water System (Section 2.3.3.B.11)
- NMP2 Engine-Driven Fire Pump Fuel Oil System (Section 2.3.3.B.12)
- NMP2 Fire Detection and Protection System (Section 2.3.3.B.13)
- NMP2 Floor and Equipment Drains System (Section 2.3.3.B.14)
- NMP2 Generator Standby Lube Oil System (Section 2.3.3.B.15)
- NMP2 Glycol Heating System (Section 2.3.3.B.16)
- NMP2 Hot Water Heating System (Section 2.3.3.B.17)
- NMP2 Makeup Water System (Section 2.3.3.B.18)
- NMP2 Neutron Monitoring System (Section 2.3.3.B.19)

- NMP2 Primary Containment Purge System (Section 2.3.3.B.20)
- NMP2 Process Sampling System (Section 2.3.3.B.21)
- NMP2 Radiation Monitoring System (Section 2.3.3.B.22)
- NMP2 Reactor Building Closed Loop Cooling Water System (Section 2.3.3.B.23)
- NMP2 Reactor Building HVAC System (Section 2.3.3.B.24)
- NMP2 Reactor Water Cleanup System (Section 2.3.3.B.25)
- NMP2 Seal Water System (Section 2.3.3.B.26)
- NMP2 Service Water System (Section 2.3.3.B.27)
- NMP2 Spent Fuel Pool Cooling and Cleanup System (Section 2.3.3.B.28)
- NMP2 Standby Diesel Generator Fuel Oil System (Section 2.3.3.B.29)
- NMP2 Standby Diesel Generator Protection (Generator) System (Section 2.3.3.B.30)
- NMP2 Standby Liquid Control System (Section 2.3.3.B.31)
- NMP2 Yard Structures Ventilation System (Section 2.3.3.B.32)

2.3.3.B.1 NMP2 AIR STARTUP STANDBY DIESEL GENERATOR SYSTEM

System Description

The NMP2 Air Startup-Standby Diesel Generator System includes the Diesel Generator Combustion Air Intake and Exhaust System. It is designed to provide 1) a sufficient volume and pressure of compressed air to enable the Emergency Diesel Generator to start within the required times; and 2) reliable combustion air intake and exhaust paths that supply clean air for combustion and a means to discharge exhaust gases outside the diesel generator building. Each Standby Diesel Generator has redundant air starting systems, either of which is capable of starting the engine.

The flowpaths for the Division I/II and Division III generators are similar, in that each air compressor supplies compressed ambient air to its air receiver through an air dryer. From there, compressed air is supplied to the air start motors through pressure control valves and, in the case of the Division I/II standby diesel generators, a moisture separator.

To supply combustion air and an exhaust path, fresh air is drawn from outside and passes through an intake filter and an intake silencer located just inside the Diesel Generator Building. The air then passes through the overspeed trip valve, an exhaust driven turbocharger, through a pair of combination intercooler-heaters and then is distributed to each cylinder bank through the engine intake manifolds. Exhaust gases are discharged to the atmosphere above the Diesel Generator Building.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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).

The components subject to an AMR include the following:

- For Division I & II: In general, they include all piping and components between the reducer on the downstream side of the flexible hose connection from the air drier to the receivers and the standby diesel generators. Included are piping segments and gate valves upstream of two of the receivers in the cross connect with the respective redundant air system as well as downstream of the pressure control valves leading to the turning gear motor. The list of components consists, in part, of various hand operated valves; air receivers with pressure relief and moisture blow down valves; pressure control valves; and moisture separators and their associated drain valves. For the Combustion Air Intake and Exhaust System, components include the generator inlet filters, relief vents, expansion bellows, inlet and exhaust piping, and atmospheric exhausts.

- For Division III: In general, they include all piping and components between the check valve on the downstream side of the flexible hose connection from the air drier to the receivers and the high pressure core spray diesel generator. The list of components consists, in part, of various hand operated valves; two air receivers with pressure relief and moisture blow down valves; pressure control valves, starting air lubricators and air operated valves. For the Combustion Air Intake and Exhaust System, components include generator inlet filters, relief vents, expansion bellow, and atmospheric exhausts.

USAR Reference(s)

More information about the Air Startup-Standby Diesel Generator System can be found in USAR Sections 9.5.6 and 9.5.8.

License Renewal Drawing(s)

Components requiring an AMR for the Air Startup-Standby Diesel Generator System are highlighted on the following drawing:

- LR-104, Sheet A, Revision 0, Standby Diesel Gen. System

Components Subject to an AMR

The component types requiring an AMR for the Air Startup-Standby Diesel Generator System and their intended functions are shown in Table 2.3.3.B.1-1. The AMR results for these component types are provided in Table 3.3.2.B-1.

Table 2.3.3.B.1-1
NMP2 Air Startup-Standby Diesel Generator System

Component Type	Intended Functions
Air Separators	Pressure Boundary
Bolting	Pressure Boundary
Diesel Engine Air Start Motors	Pressure Boundary
Filters/Strainers	Pressure Boundary
Mufflers	Pressure Boundary
Piping and Fittings	Pressure Boundary
Starting Air Lubricator	Pressure Boundary
Tanks	Pressure Boundary
Valves	Pressure Boundary

2.3.3.B.2 NMP2 ALTERNATE DECAY HEAT REMOVAL SYSTEM

System Description

The NMP2 Alternate Decay Heat Removal System, in conjunction with natural circulation, is designed to remove the decay heat released from the spent fuel pool, reactor core, reactor internals storage pool, and cavity during refueling outages to maintain reactor coolant temperatures suitable for refueling.

The Alternate Decay Heat Removal System accomplishes its design function by utilizing a primary loop for removing decay heat from the Spent Fuel Pool and the reactor core and a secondary loop to transfer the decay heat to the atmosphere. The primary loop draws water from the Spent Fuel Pool, pumps it through heat exchangers, and returns the cooled water to the reactor cavity and the Spent Fuel Pool via the Spent Fuel Pool Cooling and Cleanup System (Section 2.3.3.B.28) spargers. The secondary loop transfers heat from the plate heat exchangers to the atmosphere via the mechanical draft cooling towers.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).

- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49).

The components subject to an AMR include check valves, hand operated valves, and associated piping, fittings, and bolting inside the Reactor Building.

USAR Reference(s)

More information about the Alternate Decay Heat Removal System can be found in USAR Section 9.1.6.

License Renewal Drawing(s)

Components requiring an AMR for the Alternate Decay Heat Removal System are highlighted on the following drawing:

- LR-115, Sheet A, Revision 0, Alternate Decay Heat Removal System

Components Subject to an AMR

The component types requiring an AMR for the Alternate Decay Heat Removal System and their intended functions are shown in Table 2.3.3.B.2-2. The AMR results for these component types are provided in Table 3.3.2.B-2.

Table 2.3.3.B.2-1
NMP2 Alternate Decay Heat Removal System

Component Type	Intended Functions
Bolting	Pressure Boundary
Piping and Fittings	Pressure Boundary
Valves	Pressure Boundary

2.3.3.B.3 NMP2 AUXILIARY SERVICE BUILDING HVAC SYSTEM

System Description

The NMP2 Auxiliary Service Building HVAC System is designed to provide an environment that ensures habitability of the areas served, consistent with personnel comfort and optimum performance of equipment. The system also supplies filtered and tempered outdoor air for all air conditioned areas.

This system consists of a rooftop air conditioning unit with distribution ductwork, fans, and associated controls. Electric unit heaters are provided to offset building transmission heat losses, thus supplementing the preheat coil in the packaged rooftop air conditioning unit. The unit serves the clean access area and all areas of the auxiliary service building except the carbon dioxide tank room. The exhaust system consists of two fans. One removes ducted exhaust air from the Auxiliary Service Building and discharges into the Turbine Building, which eventually exits to the atmosphere through the main stack via the Turbine Building exhaust fans. The other fan removes ducted exhaust air from the decontamination rooms of the Auxiliary Service Building and discharges it to the atmosphere through the Reactor Building vent.

This system is in scope for license renewal for the following reason:

- It contains SCs 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).

The components subject to an AMR include the fire dampers.

USAR Reference(s)

More information about the Auxiliary Service Building HVAC System can be found in USAR Section 9.4.9.

License Renewal Drawing(s)

Components requiring an AMR for the Auxiliary Service Building HVAC System are highlighted on the following drawings:

- LR-059, Sheet B, Revision 0, Electrical Tunnels and Miscellaneous Vent System
- LR-059, Sheet C, Revision 0, Electrical Tunnels and Miscellaneous Vent System

Components Subject to an AMR

The component types requiring an AMR for the Auxiliary Service Building HVAC System and their intended functions are shown in Table 2.3.3.B.3-1. The AMR results for these component types are provided in Table 3.3.2.B-3.

Table 2.3.3.B.3-1
NMP2 Auxiliary Service Building HVAC System

Component Type	Intended Functions
Fire Dampers	Pressure Boundary

2.3.3.B.4 NMP2 CHILLED WATER VENTILATION SYSTEM

System Description

The NMP2 Chilled Water Ventilation System is designed to provide cooling for personnel and equipment in the Turbine, Normal Switchgear, and Radwaste Buildings. It supplies chilled water during normal operation to cool outdoor air used for ventilation.

The system contains mechanical refrigeration water chillers, service water pumps, chilled water circulating pumps, one expansion tank, controls, and piping. Water is provided to each chiller from the Service Water System (Section 2.3.3.B.27), while hot water is provided to the generator shell of each chiller from the Hot Water Heating System (Section 2.3.3.B.17). Chilled water is pumped through the chillers where it is cooled and sent to the cooling coils of the Turbine Building ventilation air intake unit, Radwaste Building Ventilation air intake unit, Normal Switchgear Building ventilation air intake unit and Radwaste Building air conditioning units.

This system is in scope for license renewal for the following reason:

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components subject to an AMR for this system include the NSR piping, fittings, and equipment containing liquid in the Turbine Building.

USAR Reference(s)

More information about the Chilled Water Ventilation System can be found in USAR Sections 1.2.10.5, 9.4.1.2.7, 9.4.3.2.1, 9.4.4.2.1, and 9.4.10.

License Renewal Drawing(s)

None (the only components that are subject to an AMR are NSR piping, fittings, and equipment containing liquid, which are not shown on any license renewal drawings).

Components Subject to an AMR

The component types requiring an AMR for the Chilled Water Ventilation System and their intended functions are shown in Table 2.3.3.B.4-1. The AMR results for these component types are provided in Table 3.3.2.B-4.

Table 2.3.3.B.4-1
NMP2 Chilled Water Ventilation System

Component Type	Intended Functions
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment

2.3.3.B.5 NMP2 COMPRESSED AIR SYSTEM

System Description

The NMP2 Compressed Air Systems are designed to provide clean, filtered air to various areas of NMP2. The Compressed Air Systems consist of the Instrument Air System, Service Air System, Breathing Air System, and the Primary Containment Ventilation, Purge, and Nitrogen System. Further information on these systems is provided below.

The Instrument Air System is designed to supply clean, dry, and oil-free air to plant instrumentation and control systems that require an air supply. Three instrument air compressors and three air receivers are arranged in parallel trains with a common discharge header. The Service Air System, Instrument Air System, and Breathing Air Systems are supplied from this header. The flow path for the Instrument Air System is through one of two parallel air prefilters, one of two air dryers, and one of two after filters. The air then goes to an instrument air receiving tank that supplies the Instrument Air System distribution piping network.

The Service Air System is designed to distribute service air to the plant systems that require air as a motive force or for mixing. Service air is supplied from the common compressed air supply header upstream of or downstream from the instrument air refrigerant dryers. The system is normally isolated from the primary containment, but can be supplied to stations inside the primary containment by connecting a hose from the Service Air System to the Service Air piping for the primary containment and opening the manually operated, normally locked closed, containment isolation valves.

The Breathing Air System is designed to provide a reliable supply of clean, filtered air for human breathing. It also supplies clean dry air for use of instruments. Air flows to the air receiver and through drying towers. From the drying towers, the air flows to a line that supplies all breathing stations outside of the Reactor Building and the Reactor Building air receivers. The Reactor Building Breathing Air receiver provides an additional breathing air reserve.

The Primary Containment Ventilation, Purge, and Nitrogen System is used in conjunction with the Standby Gas Treatment System (Section 2.3.2.B.8) to inert and de-inert the primary containment as required. Functions of the primary containment ventilation, purge and nitrogen system include providing a dedicated source of nitrogen gas for the operation of the Automatic Depressurization System (Section 2.3.2.B.1) relief valves, providing a primary source of instrument nitrogen for the operation of gas operated valves in primary containment, providing containment isolation, and providing containment bypass leakage control. The Primary Containment Ventilation, Purge and Nitrogen System consists of a purge fan, two liquid nitrogen storage tanks, two banks of four ambient vaporizers, two trim heaters, four electric vaporizers, six nitrogen gas storage tanks, and an instrument nitrogen receiver.

These systems are in scope for license renewal for the following reasons:

- They perform safety-related functions per 10 CFR 54.4(a)(1).
- They contain SCs 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), anticipated transients without scram (10 CFR 50.62), environmental qualification (10 CFR 50.49), and station blackout (10 CFR 50.63).

The components subject to an AMR include main steam safety relief valve accumulators, Automatic Depressurization System valve accumulators, Automatic Depressurization System air receivers, main steam isolation valve accumulators, radiation collars, and the interconnecting piping, fittings, and valves for those components as well as the supply piping, fittings, and valves for safety-related components.

USAR Reference(s)

More information about the Compressed Air Systems can be found in USAR Section 9.3.1.

License Renewal Drawing(s)

Components requiring an AMR for the Compressed Air Systems are highlighted on the following drawings:

- LR-001, Sheet A, Revision 0, Main Steam
- LR-001, Sheet B, Revision 0, Main Steam
- LR-001, Sheet C, Revision 0, Main Steam
- LR-001, Sheet D, Revision 0, Main Steam
- LR-001, Sheet E, Revision 0, Main Steam
- LR-001, Sheet F, Revision 0, Main Steam
- LR-006, Sheet A, Revision 0, Feedwater System
- LR-011, Sheet C, Revision 0, Service Water System
- LR-011, Sheet E, Revision 0, Service Water System
- LR-011, Sheet F, Revision 0, Service Water System
- LR-011, Sheet P, Revision 0, Service Water System
- LR-011, Sheet Q, Revision 0, Service Water System
- LR-013, Sheet E, Revision 0, Reactor Building Closed Loop Cooling Water
- LR-019, Sheet D, Revision 0, Instrument & Service Air
- LR-019, Sheet E, Revision 0, Instrument & Service Air
- LR-019, Sheet F, Revision 0, Instrument & Service Air
- LR-019, Sheet G, Revision 0, Instrument & Service Air

- LR-019, Sheet L, Revision 0, Instrument & Service Air
- LR-019, Sheet M, Revision 0, Instrument & Service Air
- LR-030, Sheet B, Revision 0, Control Rod Drive Hydraulic System
- LR-031, Sheet D, Revision 0, Residual Heat Removal
- LR-031, Sheet E, Revision 0, Residual Heat Removal
- LR-031, Sheet G, Revision 0, Residual Heat Removal
- LR-035, Sheet B, Revision 0, Reactor Core Isolation Cooling
- LR-035, Sheet C, Revision 0, Reactor Core Isolation Cooling
- LR-038, Sheet A, Revision 0, Fuel Pool Cooling & Clean Up
- LR-038, Sheet B, Revision 0, Fuel Pool Cooling & Clean Up
- LR-038, Sheet C, Revision 0, Fuel Pool Cooling & Clean Up
- LR-052, Sheet A, Revision 0, Rx Building Ventilation & Cat I Area Coolers
- LR-052, Sheet G, Revision 0, Rx Building Ventilation & Cat I Area Coolers
- LR-052, Sheet H, Revision 0, Rx Building Ventilation & Cat I Area Coolers
- LR-053, Sheet B, Revision 0, Control Building Ventilation and Air Conditioning
- LR-053, Sheet C, Revision 0, Control Building Ventilation and Air Conditioning
- LR-053, Sheet D, Revision 0, Control Building Ventilation and Air Conditioning
- LR-053, Sheet E, Revision 0, Control Building Ventilation and Air Conditioning
- LR-053, Sheet F, Revision 0, Control Building Ventilation and Air Conditioning

- LR-057, Sheet A, Revision 0, Diesel Generator Building Ventilation
- LR-058, Sheet A, Revision 0, Screenwell & Diesel Fire Pump Room Vent
- LR-059, Sheet B, Revision 0, Electrical Tunnels and Miscellaneous Vent System
- LR-061, Sheet A, Revision 0, Primary Containment Purge & Standby Gas Treatment
- LR-105, Sheet B, Revision 0, Nitrogen System

Components Subject to an AMR

The component types requiring an AMR for the Compressed Air Systems and their intended functions are shown in Table 2.3.3.B.5-1. The AMR results for these component types are provided in Table 3.3.2.B-5.

Table 2.3.3.B.5-1
NMP2 Compressed Air Systems

Component Type	Intended Functions
Bolting	Pressure Boundary
Piping and Fittings	Pressure Boundary
Orifices	Flow Restriction, Pressure Boundary
Radiation Collars	Radiation Shielding
Rupture Discs	Pressure Boundary
Tanks and Receivers	Pressure Boundary
Valves	NSR Functional Support
	Pressure Boundary

2.3.3.B.6 NMP2 CONTAINMENT ATMOSPHERE MONITORING SYSTEM

System Description

The NMP2 Containment Atmosphere Monitoring System is designed to supply information concerning containment parameters during normal and post accident conditions. Monitored drywell parameters are pressure, air temperature, hydrogen, and oxygen concentration, along with gaseous and particulate radiation levels. Monitored suppression chamber parameters are pressure, air temperature, hydrogen and oxygen concentration, suppression pool level, and temperature. In addition, drywell and suppression chamber humidity are monitored during containment leak rate testing.

The Containment Atmospheric Monitoring System consists of radiation and hydrogen/oxygen monitoring lines. Each line penetrates the primary containment and monitors the radiation level and hydrogen/oxygen concentration during normal operation, so they are equipped with containment isolation valves.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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), and station blackout (10 CFR 50.63).

The components subject to an AMR include sample pumps and the piping, fittings, and valves associated with the containment monitoring function.

USAR Reference(s)

More information about the Containment Atmospheric Monitoring System can be found in USAR Sections 6.2.1.7 and 6.2.4.3.2.

License Renewal Drawing(s)

Components requiring an AMR for the Containment Atmospheric Monitoring System are highlighted on the following drawings:

- LR-082, Sheet A, Revision 0, Piping & Instrumentation Diagram Containment Atmosphere Monitoring System (P&ID)

- LR-082, Sheet B, Revision 0, Piping & Instrumentation Diagram Containment Atmosphere Monitoring System (P&ID)

Components Subject to an AMR

The component types requiring an AMR for the Containment Atmospheric Monitoring System and their intended functions are shown in Table 2.3.3.B.6-1. The AMR results for these component types are provided in Table 3.3.2.B-6.

Table 2.3.3.B.6-1
NMP2 Containment Atmosphere Monitoring System

Component Type	Intended Functions
Bolting	Pressure Boundary
Condensing Chambers	Pressure Boundary
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Valves	Pressure Boundary

2.3.3.B.7 NMP2 CONTAINMENT LEAKAGE MONITORING SYSTEM

System Description

The NMP2 Containment Leakage Monitoring System is designed to provide a means of monitoring the drywell area pressure and the suppression chamber pressure during periodic leak rate testing. Two independent pressure sensing lines penetrate the primary containment and connect to instrumentation outside the drywell during testing. The system also continuously monitors the drywell electrical penetrations to detect leakage past the sealing mechanism.

The system consists of cables, switches, transmitters, indicators, relays, fuses, power supplies, containment isolation devices, and various raceways, tubing/lines, hangars, and penetrations.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49).

The components subject to an AMR include shutoff valves inside the drywell and suppression chamber, shutoff valves outside the drywell and suppression chamber, and the associated piping between them.

USAR Reference(s)

More information about the Containment Leakage Monitoring System can be found in USAR Section 6.2.6.

License Renewal Drawing(s)

Components requiring an AMR for the Containment Leakage Monitoring System are highlighted on the following drawing:

- LR-081, Revision 0, Piping & Instrumentation Diagram Containment Leakage Monitoring System (P&ID)

Components Subject to an AMR

The component types requiring an AMR for the Containment Leakage Monitoring System and their intended functions are shown in Table 2.3.3.B.7-1. The AMR results for these component types are provided in Table 3.3.2.B-7.

Table 2.3.3.B.7-1
NMP2 Containment Leakage Monitoring System

Component Type	Intended Functions
Piping and Fittings	Pressure Boundary
Valves	Pressure Boundary

2.3.3.B.8 NMP2 CONTROL BUILDING CHILLED WATER SYSTEM

System Description

The NMP2 Control Building Chilled Water System is designed to provide chilled water to the air conditioning units that provide cooling for personnel and equipment in the control room, relay room, remote shutdown room, and computer room. This system is designed to perform during normal operation, plant shutdown, or accident conditions without loss of function.

The Control Building Chilled Water System is a closed loop piping system consisting of two independent, redundant chilled water loops. Each loop consists of a chilled water pump, a chiller compressor, an expansion tank, and the cooling coils of the air conditioning units. The chilled water pumps take suction at the expansion tank and circulate the water through the control building chilled water chillers, cooling coils, and then back to the pump. Thermostatically controlled valves regulate the bypass flow around the cooling coils to maintain the set temperature. The heat gained by the chilled water at each air conditioning unit is rejected to service water supplied to each chiller by safety related portions of the Service Water System (Section 2.3.3.B.27).

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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) and environmental qualification (10 CFR 50.49).

The components subject to an AMR include the chilled water circulating pumps, the passive subcomponents within the chillers, the chilled water expansion tanks, and the interconnecting piping and valves up to the ventilation units in the Control Room and the Remote Shutdown Room. The subcomponents within those ventilating units are included within the scope of the Control Building HVAC System (Section 2.3.3.B.9). The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Control Room Building.

USAR Reference(s)

More information about the Control Building Chilled Water System can be found in USAR Sections 7.3.1.1.11 and 9.4.10.1.

License Renewal Drawing(s)

Components requiring an AMR for the Control Building Chilled Water System are highlighted on the following drawings:

- LR-011, Sheet J, Revision 0, Service Water System
- LR-053, Sheet A, Revision 0, Control Building Chilled Water

Components Subject to an AMR

The component types requiring an AMR for the Control Building Chilled Water System and their intended functions are shown in Table 2.3.3.B.8-1. The AMR results for these component types are provided in Table 3.3.2.B-8.

Table 2.3.3.B.8-1
NMP2 Control Building Chilled Water System

Component Type	Intended Functions
Chillers	Heat Transfer, Pressure Boundary
	Pressure Boundary
Flow Elements	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Tanks	Pressure Boundary
Valves	Pressure Boundary

2.3.3.B.9 NMP2 CONTROL BUILDING HVAC SYSTEM

System Description

The NMP2 Control Building HVAC System provides filtration, pressurization, heating and cooling to the control building envelope during normal and emergency operations by operating in normal, smoke purge and emergency modes.

Outdoor air is supplied to the control building through missile and tornado protected air intakes. From the intakes, the air is drawn into large duct chases by the four air conditioning units. The air is heated or cooled by cooling coils in the air conditioning units or by heaters in the ductwork and force circulated by the air conditioning unit fans throughout the control building envelope. Natural exhaust ventilation is provided through return registers back to the duct chases where most of the air is then recirculated.

In the emergency mode, the system will divert the intake air through special filters under certain conditions. The filter trains are normally bypassed and automatically come on line on either a supply air radiation monitor trip system signal or a LOCA signal. They would then provide filtered air to the Control, Relay, and Computer Rooms. The system is equipped with a special smoke removal system for use post fire. It removes smoke and heat from the control building using special supply and exhaust fans, dampers, and controls.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function(s) per 10 CFR 54.4(a)(1).

- It contains SCs 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), and station blackout (10 CFR 50.63).

The components subject to an AMR include control building air conditioning units, each with its own fan and filter train, tornado dampers, fire dampers, and the associated system ducting and dampers. Additionally, equipment used for smoke removal (i.e., air handling unit, smoke removal fans, and associated ducting and dampers) is also subject to an AMR.

USAR Reference(s)

More information about the Control Building HVAC System can be found in USAR Section 9.4.1.

License Renewal Drawing(s)

Components requiring an AMR for the Control Building HVAC System are highlighted on the following drawings:

- LR-053, Sheet A, Revision 0, Control Building Chilled Water
- LR-053, Sheet B, Revision 0, Control Building Ventilation and Air Conditioning
- LR-053, Sheet C, Revision 0, Control Building Ventilation and Air Conditioning
- LR-053, Sheet D, Revision 0, Control Building Ventilation and Air Conditioning
- LR-053, Sheet E, Revision 0, Control Building Ventilation and Air Conditioning
- LR-053, Sheet F, Revision 0, Control Building Ventilation and Air Conditioning
- LR-054, Sheet A, Revision 0, Chilled Water and Normal Switchgear Building Ventilation
- LR-059, Sheet B, Revision 0, Electrical Tunnels and Miscellaneous Vent System

Components Subject to an AMR

The component types requiring an AMR for the Control Building HVAC System and their intended functions are shown in Table 2.3.3.B.9-1. The AMR results for these component types are provided in Table 3.3.2.B-9.

Table 2.3.3.B.9-1
NMP2 Control Building HVAC System

Component Type	Intended Functions
Air Handling Unit	NSR Functional Support
Blowers	NSR Functional Support
	Pressure Boundary
Ducting	Pressure Boundary
Filters/Strainers	Filtration, Pressure Boundary
	NSR Functional Support
Flow Elements	Pressure Boundary
Heat Exchangers	Heat Transfer, Pressure Boundary
Piping and Fittings	Pressure Boundary
Radiation Sample Point	Pressure Boundary
Valves and Dampers (includes fire dampers)	NSR Functional Support
	Pressure Boundary

2.3.3.B.10 NMP2 DIESEL GENERATOR BUILDING VENTILATION SYSTEM

System Description

The NMP2 Diesel Generator Building Ventilation System is designed to provide heating and outside air ventilation to the diesel rooms and diesel generator control rooms. Each Diesel Generator room is equipped with its own ventilation system. Additionally, the Diesel Generator Building Ventilation HVAC System is designed with unit coolers to maintain habitable conditions for personnel comfort within the diesel generator control rooms.

The Diesel Generator Building Ventilation system performs the following functions: normal heating, normal ventilation, control room cooling, and general area emergency ventilation. The normal duty heating function maintains the Diesel Generator rooms above 65°F during the winter. The normal ventilation function maintains the Diesel Generator rooms adequately ventilated and exhausts room air to the atmosphere. The control room cooling function maintains the Diesel Generator rooms below the maximum design temperature. Cooling water for the unit coolers is provided from the Service Water System (Section 2.3.3.B.27). The general area emergency ventilation function establishes a ventilating flow of outside air through the Diesel Generator rooms to ensure that the space temperatures remain below 125°F outside the control room or 104°F inside the control room for efficient equipment operation.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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) and environmental qualification (10 CFR 50.49).

The components subject to an AMR include the diesel generator room ventilation blowers, diesel generator room motor-operated dampers, diesel generator control room unit coolers and associated ductwork, tornado dampers, inlet dampers, and associated ductwork.

USAR Reference(s)

More information about the Diesel Generator Building Ventilation System can be found in USAR Section 9.4.6.

License Renewal Drawing(s)

Components requiring an AMR for the Diesel Generator Building Ventilation System are highlighted on the following drawings:

- LR-011, Sheet L, Revision 0, Service Water System
- LR-057, Sheet A, Revision 0, Diesel Generator Building Ventilation

Components Subject to an AMR

The component types requiring an AMR for the Diesel Generator Building Ventilation System and their intended functions are shown in Table 2.3.3.B.10-1. The AMR results for these component types are provided in Table 3.3.2.B-10.

Table 2.3.3.B.10-1
NMP2 Diesel Generator Building Ventilation System

Component Type	Intended Functions
Blowers	Pressure Boundary
Dampers (includes fire dampers)	NSR Functional Support
	Pressure Boundary
Ducting	Pressure Boundary
Unit Coolers	Pressure Boundary

2.3.3.B.11 NMP2 DOMESTIC WATER SYSTEM

System Description

The NMP2 Domestic Water System is designed to provide sufficient domestic water from an existing city main to various areas of the plant including the Water Treatment System (not in scope for license renewal) and the Fire Protection System (Section 2.3.3.B.13). Additionally the Domestic Water System ensures minimization of flooding potential by providing isolation capabilities of the Control Building from domestic water supply, should piping within the building rupture during a seismic event. Domestic water is supplied to various buildings throughout the plant including the Control Building, Turbine Building, and the Auxiliary Building. The Domestic Water System also provides makeup water to various systems including the Fire Protection System and the Filtered Water Tank.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components subject to an AMR include one isolation valve inside the Control Building. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Auxiliary Service Building, Decontamination Area (located south of the Radwaste Building),Radwaste Building, Screenwell Building and Turbine Building.

USAR Reference(s)

More information about the Domestic Water System can be found in USAR Sections 1.2.10.10 and 9.2.4.

License Renewal Drawing(s)

Components requiring an AMR for the Domestic Water System are highlighted on the following drawing:

- LR-050, Sheet A, Revision 0, Domestic Water (P&ID)

Components Subject to an AMR

The component types requiring an AMR for the Domestic Water System and their intended functions are shown in Table 2.3.3.B.11-1. The AMR results for these component types are provided in Table 3.3.2.B-11.

Table 2.3.3.B.11-1
NMP2 Domestic Water System

Component Type	Intended Functions
Bolting	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Valves	Pressure Boundary

2.3.3.B.12 NMP2 ENGINE-DRIVEN FIRE PUMP FUEL OIL SYSTEM

The NMP2 Engine-Driven Fire Pump Fuel Oil System is designed to supply fuel oil to the diesel engine-driven fire pump. The electric-driven fire pump and diesel engine-driven fire pump are located in separate rooms within the Screenwell Building. The fuel oil storage tank for the diesel fire pump is located in the diesel fire pump room above a sump. Fuel is gravity fed to the engine and excess fuel supplied to the engine by its fuel pump is recirculated to the tank.

This system is in scope for license renewal for the following reason:

- It contains SCs 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).

The components subject to an AMR include the fuel oil storage tank, all associated suction and discharge piping and valves between the fuel oil storage tank and the fire pump diesel engine, all associated piping between the fuel oil storage tank and the Screenwell Building atmospheric vent, and all associated piping and valves from the Screenwell Building fill connection to the fuel oil storage tank.

USAR Reference(s)

More information about the Engine-Driven Fire Pump Fuel Oil System can be found in USAR Sections 9.5.1.2.2 and 9A.3.1.2.5.6.

License Renewal Drawing(s)

Components requiring an AMR for the Engine-Driven Fire Pump Fuel Oil System are highlighted on the following drawing:

- LR-043, Sheet A, Revision 0, Fire Protection - Water

Components Subject to an AMR

The component types requiring an AMR for the Engine-Driven Fire Pump Fuel Oil System and their intended functions are shown in Table 2.3.3.B.12-1. The AMR results for these component types are provided in Table 3.3.2.B-12.

Table 2.3.3.B.12-1
NMP2 Engine-Driven Fire Pump Fuel Oil System

Component Type	Intended Functions
Piping and Fittings	NSR Functional Support
Tank	NSR Functional Support
Valves	NSR Functional Support

2.3.3.B.13 NMP2 FIRE DETECTION AND PROTECTION SYSTEM

System Description

The NMP2 Fire Detection and Protection System is designed for detecting, alarming, isolating and suppressing fires in the plant. It contains SSCs relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations. The fire protection system consists, in part, of a reliable freshwater supply, one electric motor-driven fire pump and one diesel engine-driven fire pump, two pressure maintenance fire pumps, one pressure maintenance pump supply tank, one hydropneumatic tank, fire water yard mains, hydrants, standpipes, hose stations, sprinkler, water spray, preaction and deluge systems, foam-water deluge systems, low-pressure carbon dioxide systems, Halon 1301 systems, and a detection and signaling system. These components in the Fire Detection and Protection System are further divided into the Fire Protection Foam System, the Fire Protection Halon System, the Cardox Fire Protection System, the Fire Detection System, and the Fire Protection Water System. The collective capability of the fire suppression systems is adequate to minimize potential damage to safety-related equipment and is a major element in the facility fire protection program. Further information on these systems is provided below.

The Fire Protection Foam System provides fire suppression through blanketing affected areas with dense foam provided by mixing of fire system water, foam concentrate, and air. The system is manually initiated and is split into two foam supply systems, fixed and hose reel. Each supply system consists of a foam concentrate storage tank and pumps. Either tank can be lined up to supply the other system if needed.

The Fire Protection Halon System is designed to suppress cable fires in the floor sections of the computer room, relay room, control room, and the radwaste control room. This system is actuated either automatically by fire detectors or manually from the main control room or at local fire panels. The Fire Protection Halon System fire detectors provide common alarms, zone alarms into their respective local panels, and individual alarms into the Fire Protection Computer.

The Cardox Fire Protection System is designed to supply carbon dioxide to fixed and hose reel stations for the purpose of extinguishing fires. The system consists of two 13-ton storage tanks, a refrigeration unit, valves, and piping that conveys carbon dioxide to fixed nozzles at individual hazards. Total-flooding carbon dioxide systems are: 1) switchgear rooms, 2) standby and HPCS switchgear rooms, 3) 600V switchgear room, 4) radwaste switchgear room, 5) lube oil reservoir in the turbine building, and

6) alternator-exciter enclosure in the Turbine Building. These stations are provided with automatic initiation capabilities. Manually-actuated local application systems are provided to protect turbine generator bearings and oil piping and carbon dioxide hose stations are provided in the Turbine, Control, Reactor, Normal Switchgear, and Diesel Generator Buildings. Operation of each carbon dioxide system is signaled locally and in the main control room. The system also supplies carbon dioxide to the main generator for the purpose of hydrogen purging, and air purging.

The Fire Detection System is designed to provide early detection, annunciation, and actuation of suppression systems in the event of a fire. The thermal and smoke detection systems function to detect products of combustion, alarming both locally and in the main control room. Where suppression is automatic, the detection system functions to actuate associated suppression systems. The Fire Detection System gives audible and visual annunciation in the control room and local audible alarms.

The Fire Protection Water System is designed to provide a reliable, readily available source of water for controlling and extinguishing fires. Additionally the Fire Protection Water System provides control room indication and may be used as an alternative injection/spray source into the RPV or primary containment by cross-connecting Fire Protection Water to the Residual Heat Removal System (Section 2.3.2.B.7). The Fire Protection Water System is composed of hose stations, hydrants, deluge, and water spray systems, fire pumps, sprinkler systems and pressure maintenance pumps. The water source for the fire protection system is Lake Ontario, which is considered to be unlimited. The water supply to the fire pumps is sufficient to meet the largest expected fire demand, and either one of the two supplied fire pumps is capable of providing this expected largest demand flow. One electric motor-driven and one diesel engine-driven fire pump are provided. The yard fire protection loop for NMP2 is interconnected with the NMP1 fire loop.

The Fire Detection and Protection system is in scope for license renewal for the following reasons:

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

- It contains SCs 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).

The components subject to an AMR for the above described Fire Detection and Protection subsystems include the following:

- The Fire Protection Foam subsystem components subject to AMR consist of one water header valve.
- The Fire Protection Halon subsystem components subject to AMR consist of halon storage tanks and their associated halon distribution system piping and fittings, valves, rupture discs, flow orifices, flex hoses, and discharge nozzles.
- The Cardox Fire Protection subsystem components subject to AMR consist of the carbon dioxide storage tanks and their associated distribution system piping and fittings, valves, hoses, and nozzles.
- The Fire Detection subsystem contains only active components and, therefore, has no components subject to AMR.
- The Fire Protection Water subsystem components subject to AMR consist of the motor-driven and diesel engine-driven fire pumps, the cooling water system for the engine-driven pump including its heat exchangers, the engine-driven pump exhaust system including the piping and muffler, and the associated fire protection water distribution system piping and fittings, valves, flow orifices, strainers and sprinklers.

The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Control Building, Decontamination Area (located south of the Radwaste Building), Diesel Generator Building, Radwaste Building, Reactor Building (secondary containment), Screenwell Building, Standby Gas Treatment Building, and Turbine Building.

<u>USAR Reference(s)</u>

More information about the Fire Detection and Protection System can be found in USAR Sections 9.5.1, 9A.3.1.2.5.4, and 9A.3.6.

<u>License Renewal Drawing(s)</u>

Components requiring an AMR for the Fire Detection and Protection System are highlighted on the following drawings:

- LR-043, Sheet A, Revision 0, Fire Protection – Water

- LR-043, Sheet B, Revision 0, Fire Protection – Water
- LR-043, Sheet C, Revision 0, Fire Protection – Water
- LR-043, Sheet D, Revision 0, Fire Protection – Water
- LR-043, Sheet E, Revision 0, Fire Protection – Water
- LR-043, Sheet F, Revision 0, Fire Protection – Water
- LR-043, Sheet G, Revision 0, Fire Protection – Water
- LR-043, Sheet H, Revision 0, Fire Protection – Water
- LR-044, Sheet A, Revision 0, Fire Protection – Foam
- LR-045, Sheet A, Revision 0, Fire Protection, CO_2 System
- LR-045, Sheet B, Revision 0, Fire Protection, Low Pressure, CO_2
- LR-045, Sheet C, Revision 0, Fire Protection, CO_2 System
- LR-046, Sheet A, Revision 0, Fire Protection – Halon

Components Subject to an AMR

The component types requiring an AMR for the Fire Detection and Protection System and their intended functions are shown in Table 2.3.3.B.13-1. The AMR results for these component types are provided in Table 3.3.2.B-13. (Note: The in-scope components for the Fire Detection System are active components. Therefore, there are no components requiring an AMR for the Fire Detection System.)

Table 2.3.3.B.13-1
NMP2 Fire Detection and Protection System

Component Type	Intended Functions
Bolting	NSR Functional Support
Fire Hydrants	NSR Functional Support
Flow elements	NSR Functional Support
Halon Tank Flex Hoses	NSR Functional Support
Heat Exchangers	NSR Functional Support
Hose Reels	NSR Functional Support
Manifold	NSR Functional Support
Nozzles	NSR Functional Support
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Odorizers	NSR Functional Support
Orifices	NSR Functional Support
Piping and Fittings	NSR Functional Support
Pumps	NSR Functional Support
Rupture Discs	NSR Functional Support
Silencer	NSR Functional Support
Strainers	NSR Functional Support
Tanks	NSR Functional Support
Temperature Indicators	NSR Functional Support
Valves	NSR Functional Support

2.3.3.B.14 NMP2 FLOOR AND EQUIPMENT DRAINS SYSTEM

System Description

The Floor and Equipment Drains System consists of the Drywell and Reactor Building Equipment Drains/Floor Drains, the Standby Diesel Generator Building Floor and Equipment Drains, the Miscellaneous Floor and Equipment Drains, the Radwaste Building Floor and Equipment Drains, the Reactor Building Floor Drains, the Service Building Floor and Equipment Drains, the Turbine Building Equipment Drains, the Turbine Building Floor Drains, and the Turbine Plant Miscellaneous Drains subsystems. The Floor and Equipment Drains System collects, holds, monitors, and discharges drainage from floor and equipment drain sub-systems from various buildings/areas and provides for the proper handling and disposal of radioactive and non-radioactive effluents.

Floor and equipment drain systems are designed to prevent contamination of the storm drain system with effluent from sumps containing radioactive or potentially radioactive drainage. The effluent from all sumps/tanks in a given building is discharged to one of the following disposal points:

- Radwaste System for radioactive or potentially radioactive drains.
- Storm Drain System or discharge tunnel for nonradioactive drains.

The Floor and Equipment Drain Systems serving buildings that house SR equipment have sufficient capacity to prevent excessive drain buildup that could affect the operability of the equipment. The discharge piping from each sump pump contains a check valve to prevent backflow from one pump to another.

Each equipment and floor drain sump receiving radioactive influent is lined with either stainless steel or fiberglass to prevent migration of its contents. Sumps receiving nonradioactive influent are of concrete and are not lined. Each sump is sized to contain the influent from the equipment or area it serves.

Flow from Floor and Equipment Drains that has no potential for radioactive contamination is discharged to the Storm Drainage System. Prior to discharge into the Storm Drainage System, all potentially oily drainage (except for the diesel fire pump room) is routed through an oil separator.

The Floor and Equipment Drains System is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), and station blackout (10 CFR 50.63).

The components subject to an AMR include the drywell equipment and drywell floor drain tanks, their pumps, and the associated piping and fittings, valves, strainers, and flow orifices. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Auxiliary Service Building, Control Room Building, Diesel Generator Building, Main Stack, Primary Containment Structure, Radwaste Building, Reactor Building (secondary containment), Screenwell Building, and Turbine Building.

USAR Reference(s)

More information about the Floor and Equipment Drains System can be found in USAR Section 9.3.3.

License Renewal Drawing(s)

Components requiring an AMR for the Floor and Equipment Drains System are highlighted on the following drawings:

- LR-037, Sheet A, Revision 0, Reactor Water Cleanup System
- LR-063, Sheet A, Revision 0, Reactor Building Equipment and Floor Drains
- LR-063, Sheet C, Revision 0, Reactor Building Equipment and Floor Drains
- LR-063, Sheet D, Revision 0, Reactor Building Equipment and Floor Drains

- LR-063, Sheet E, Revision 0, Reactor Building Equipment and Floor Drains
- LR-066, Sheet B, Revision 0, Miscellaneous Drains
- LR-067, Sheet A, Revision 0, Drywell Equipment Drains

Components Subject to an AMR

The component types requiring an AMR for the Floor and Equipment Drains System and their intended functions are shown in Table 2.3.3.B.14-1. The AMR results for these component types are provided in Table 3.3.2.B-14.

Table 2.3.3.B.14-1
NMP2 Floor and Equipment Drains System

Component Type	Intended Functions
Bolting	Pressure Boundary
Drain Tank	NSR Functional Support
Floor Drains	NSR Functional Support
Flow Elements	NSR Functional Support
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Direct Flow
	NSR Functional Support
	Pressure Boundary
Pumps	NSR Functional Support
Orifices	Flow Restriction, Pressure Boundary
Spray Nozzle	NSR Functional Support
Strainers	NSR Functional Support
Valves	Direct Flow
	NSR Functional Support
	NSR Functional Support Pressure Boundary
	Pressure Boundary

2.3.3.B.15 NMP2 GENERATOR STANDBY LUBE OIL SYSTEM

System Description

The NMP2 Generator Standby Lube Oil System is designed to lubricate the engine bearings, turbocharger, and other moving parts of the emergency diesel generators. Additionally, this system preheats the oil, prelubricates the engine, warms the jacket water, cools the pistons, and keeps the inside of the engine clean by preventing rust and corrosion. System components include lube oil pumps, coolers, heaters, strainers, filters, pressure regulators, control valves, and piping. The Generator Standby Lube Oil System also features a Generator Standby Temperature System that preheats the lubricating oil and jacket water to enhance long-term engine reliability and first-try starting of the diesel engine.

The Division I/II and Division III systems differ slightly, and the positions of the cooler and the filter/strainer are reversed, but the basic flow paths are similar. Depending upon the status of the engine, either the circulating pump or the main oil pump takes oil from the engine sump and circulates it through a cooler, filter/strainer, and then directs it to the engine. Then, the oil flows to the main bearings, the connecting rod bearings, the connecting rods and pins, and to the pistons. From the pistons, oil drains back to the sump. When the engine starts, the circulating oil pump stops and the main engine-driven oil pump takes over. A thermostatic valve controls the oil temperature to the engine by regulating the flow to the oil cooler. Both systems also have special filtering and oil supply provisions for their respective turbochargers.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

- It contains SCs 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).

The components subject to an AMR include the following:

- For Division I & II: motor driven lube oil circulating pumps, heaters and associated check valves, suction side gate valves, and discharge side relief valves and gate valves; engine driven main lube oil pumps, suction side check valves, and discharge side relief valves; lube oil coolers and the three-way thermostatic valves located ahead of the coolers, and drain valves; valves associated with the lube oil filters and the gate valves in the lube oil filter bypass lines; lube oil strainers and plug valves (one on each side of a strainer); turbocharger oil filters and associated valves and a relief valve upstream of the turbocharger oil filters.

- For Division III: scavenging pump and strainer drain valve; main lube oil pump; piston cooling oil pump; lube oil circulating pumps, discharge side check valves, and discharge side relief valve; turbocharger lube oil pumps, discharge side swing check valves, and discharge side relief valve; lube oil cooler discharge side swing check valve; and jacket water heater.

USAR Reference(s)

More information about the Generator Standby Lube Oil System can be found in USAR Section 9.5.7.

License Renewal Drawing(s)

Components requiring an AMR for the Generator Standby Lube Oil System are highlighted on the following drawings:

- LR-104, Sheet D, Revision 0, Jacket Water Standby Diesel Generator System
- LR-104, Sheet E, Revision 0, Lube Oil Standby Diesel Generator System

Components Subject to an AMR

The component types requiring an AMR for the Generator Standby Lube Oil System and their intended functions are shown in Table 2.3.3.B.15-1. The AMR results for these component types are provided in Table 3.3.2.B-15.

Table 2.3.3.B.15-1
NMP2 Generator Standby Lube Oil System

Component Type	Intended Functions
Filters/Strainers	Pressure Boundary
Heat Exchangers	Heat Transfer, Pressure Boundary
	Pressure Boundary
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Orifices	Pressure Boundary
Valves	Pressure Boundary

2.3.3.B.16 NMP2 GLYCOL HEATING SYSTEM

System Description

The NMP2 Glycol Heating System functions with the Hot Water Heating System (Section 2.3.3.B.17) to heat outdoor makeup air used for ventilation. Water from the Hot Water Heating System is used to heat the ethylene glycol solution to its required design temperature. The heated glycol solution is then circulated through outdoor makeup air preheating coils, thereby preventing freezeup of the coils when the outdoor temperature is below freezing, while heating the outdoor air to the design temperature.

The Glycol Heating System consists of three subsystems. One subsystem, located in the Turbine Building, serves the Turbine Building Ventilation System (not in scope for license renewal). The second subsystem, located in the Standby Gas Treatment Building, serves the Reactor Building HVAC System (Section 2.3.3.B.24). The third subsystem, located in the Radwaste Building, serves the Radwaste Building Ventilation System (not in scope for license renewal). The subsystems are not interconnected. Each subsystem contains a glycol heat exchanger, glycol circulating pumps, an expansion tank, a glycol addition tank, a glycol drainage tank, an air separator, an outdoor air preheating coil assembly, piping, valves, instrumentation, and controls.

The systems are closed loop wherein the pumps take suction at the expansion tank, circulate the glycol though the heat exchanger where it picks up heat from the Hot Water Heating System, then through the outdoor makeup air preheating coils, and finally back to the pumps.

This system is in scope for license renewal for the following reason:

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components subject to an AMR for this system include the NSR piping, fittings, and equipment containing liquid in the Screenwell Building, Standby Gas Treatment Building, and Turbine Building.

USAR Reference(s)

More information about the Glycol Heating System can be found in USAR Section 9.4.11.

License Renewal Drawing(s)

None (the only components that are subject to an AMR are NSR piping, fittings, and equipment containing liquid, which are not shown on any license renewal drawings).

Components Subject to an AMR

The component types requiring an AMR for the Glycol Heating System and their intended functions are shown in Table 2.3.3.B.16-1. The AMR results for these component types are provided in Table 3.3.2.B-16.

Table 2.3.3.B.16-1
NMP2 Glycol Heating System

Component Type	Intended Functions
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment

2.3.3.B.17 NMP2 HOT WATER HEATING SYSTEM

System Description

The NMP2 Hot Water Heating System functions with the Glycol Heating System (Section 2.3.3.B.16) to heat outdoor makeup air used for ventilation. Hot water is generated from steam and is circulated through glycol heat exchangers. The Hot Water Heating System is equipped with piping connections to allow this system to be connected to a temporary hot water heating plant. This is only used if the Hot Water Heating System is not available and glycol heating in the Reactor Building is needed. The Hot Water Heating System consists of hot water recirculation pumps, heat exchangers, an expansion tank, nitrogen bottles, makeup water pumps, an air separator, piping, valves, instrumentation, and controls.

The system is closed loop. Depending upon the operating mode, electric boiler, reactor water, or extraction steam is supplied to the shell side of both the building heating auxiliary heat exchangers and the intermediate heat exchangers. The intermediate heat exchangers drain to the main steam condenser and the auxiliary heat exchangers drain to the auxiliary boiler deaerator. The hot water recirculating pump takes suction at the expansion tank and then circulates water through the building heating intermediate heat exchangers or the building heating auxiliary heat exchangers. The heated water subsequently passes through one of three sets of water-to-glycol heat exchangers: reactor building glycol heat exchangers, turbine building glycol heat exchangers, or radwaste building glycol heat exchangers. The water then returns to the pump suction.

This system is in scope for license renewal for the following reason:

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components subject to an AMR for this system include the NSR piping, fittings, and equipment containing liquid in the Control Room Building, Reactor Building (secondary containment), Radwaste Building, Screenwell Building, Standby Gas Treatment Building, and Turbine Building.

USAR Reference(s)

More information about the Hot Water Heating System can be found in USAR Section 9.4.12.

License Renewal Drawing(s)

None (the only components that are subject to an AMR are NSR piping, fittings, and equipment containing liquid, which are not shown on any license renewal drawings).

Components Subject to an AMR

The component types requiring an AMR for the Hot Water Heating System and their intended functions are shown in Table 2.3.3.B.17-1. The AMR results for these component types are provided in Table 3.3.2.B-17.

Table 2.3.3.B.17-1
NMP2 Hot Water Heating System

Component Type	Intended Functions
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment

2.3.3.B.18 NMP2 MAKEUP WATER SYSTEM

System Description

The NMP2 Makeup Water System is designed to provide demineralized Makeup Water for the Turbine Building Closed Loop Cooling Water System (not in scope for license renewal), and the Reactor Building Closed Loop Cooling Water System (Section 2.3.3.B.23). The system consists of the Makeup Water Treatment System and the Makeup Water Storage and Transfer System. Additionally, the Makeup Water System meets plant requirements for demineralized water, including the suppression pool and the spent fuel pool.

The Makeup Water System produces demineralized water by removing dissolved and suspended solids from city water using a portable demineralizer. The Makeup Water System also stores and distributes demineralized water from the Water Treatment System (not in scope for license renewal).

This system is in scope for license renewal for the following reason:

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components subject to an AMR for this system include the NSR piping, fittings, and equipment containing liquid in the Control Room Building, Decontamination Area (located south of the Radwaste Building), Radwaste Building, Reactor Building (secondary containment), Screenwell Building and Turbine Building.

USAR Reference(s)

More information about the Makeup Water System can be found in USAR Section 1.2.10.9.

License Renewal Drawing(s)

None (the only components that are subject to an AMR are NSR piping, fittings, and equipment containing liquid, which are not shown on any license renewal drawings).

Components Subject to an AMR

The component types requiring an AMR for the Makeup Water System and their intended functions are shown in Table 2.3.3.B.18-1. The AMR results for these component types are provided in Table 3.3.2.B-18.

Table 2.3.3.B.18-1
NMP2 Makeup Water System

Component Type	Intended Functions
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment

2.3.3.B.19 NMP2 NEUTRON MONITORING SYSTEM

System Description

The Neutron Monitoring System is designed to provide neutron flux level monitoring of the reactor in three separate ranges, Source Range Monitoring, Intermediate Range Monitoring, and Power Range Monitoring. It is used to monitor and aid the operator in controlling the reactor from startup through full power, inputs to the Reactor Manual Control System (not within scope of license renewal) to initiate rod blocks if preset flux limits are exceeded, and it inputs signals to the Reactor Protection System (Section 2.5.B.18) to initiate a scram if limits are exceeded. The Neutron Monitoring System has five subsystems. The Source Range Monitoring subsystem measures the flux from startup through criticality. The Intermediate Range Monitoring subsystem overlaps the Source Range Monitoring subsystem and extends well into the power range. The power range is monitored by detectors that make up the Local Power Range Monitor subsystem. The Average Power Range Monitor subsystem is composed of core-wide sets of Local Power Range Monitor detectors that are averaged to provide a core average neutron flux. The Traversing In-core Probe subsystem provides a means for calibrating the Local Power Range Monitor subsystem.

The Source Range Monitoring and Intermediate Range Monitoring subsystems are equipped with mechanically retractable detector assemblies which allow the operator to insert the detectors into the reactor core whenever the channels are needed, and then retract the detectors to a low neutron flux region to prevent unnecessary burnup. The Local Power Range Monitoring detectors are installed at fixed locations in the reactor core. The Average Power Range Monitoring subsystem uses the signals from the Local Power Range Monitoring detectors to provide average power range signals for monitoring.

The Neutron Monitoring System also includes the Traversing In-core Probe System. It consists of five identical trains, each consisting of a neutron detector probe, drive mechanism, indexing mechanism, valve assembly, shield chamber, and control and readout equipment. The drive mechanism inserts and withdraws the Traversing In-core Probe and the cable from the reactor and provides detector position indication signals to the Traversing In-core Probe Control and Monitoring Panel. The indexing mechanism is used to align the probe with the core location to be traversed. Ball and shear valves function as reactor coolant isolation valves if a leak were to occur in a calibration or guide tube. The shield chamber provides a storage place for the Traversing In-core Probe detector. The Traversing In-core Probe System has a purge system which prevents rusting of the detector and caking of the guide tube lubricant.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

The components subject to an AMR include the Traversing In-core Probe automatic and remote manual isolation valves, expansion joint assemblies, and the guide tube drywell penetrations. The dry tubes for Source Range Monitoring and Intermediate Range Monitoring detectors are not included in the system boundary. The dry tubes are included with the RPV Internals (Section 2.3.1.B.2).

USAR Reference(s)

More information about the Neutron Monitoring System can be found in USAR Section 7.7.1.7.

License Renewal Drawing

Components requiring an AMR for the Neutron Monitoring System are highlighted on the following drawing:

- LR-12177-EM-38A, Revision 0, Arrangement Neutron Monitoring System - Reactor Building

Components Subject to an AMR

The component types requiring an AMR for the Neutron Monitoring System and their intended functions are shown in Table 2.3.3.B.19-1. The AMR results for these component types are provided in Table 3.3.2.B-19.

Table 2.3.3.B.19-1
NMP2 Neutron Monitoring System

Component Type	Intended Functions
Bellows	Pressure Boundary
Piping and Fittings	Pressure Boundary
Valves	Pressure Boundary

2.3.3.B.20 NMP2 PRIMARY CONTAINMENT PURGE SYSTEM

System Description

The NMP2 Primary Containment Purge System is designed to inert the primary containment with nitrogen, and to limit oxygen and hydrogen concentrations in the primary containment and ensure a combustible atmosphere does not occur following a LOCA. The Primary Containment Purge System is also designed to de-inert and ventilate the primary containment during plant shutdown for the purpose of drywell entry. The Primary Containment Purge System operates as a subsystem of the Reactor Building HVAC System (Section 2.3.3.B.24).

The purge subsystem consists of one centrifugal fan, piping, valves, controls, and accessories. Piping penetrations through the primary containment are each protected with redundant safety-related normally closed, fail closed isolation valves which close on a LOCA. Inerting the primary containment is accomplished by feed and bleed. To inert, nitrogen gas from the Nitrogen System [see the Compressed Air Systems (Section 2.3.3.B.5)] is fed into the drywell or suppression chamber. Air is exhausted into and processed by the Standby Gas Treatment System (Section 2.3.2.B.8) before it is discharged through the main stack.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49).

The components subject to an AMR include the SR valves and inclusive piping associated with each of the primary containment piping penetrations related with this system.

USAR Reference(s)

More information about the Primary Containment Purge System can be found in USAR Section 9.4.2.2.2.

License Renewal Drawing(s)

Components requiring an AMR for the Primary Containment Purge System are highlighted on the following drawing:

- LR-061, Sheet A, Revision 0, Primary Containment Purge & Standby Gas Treatment

Components Subject to an AMR

The component types requiring an AMR for the Primary Containment Purge System and their intended functions are shown in Table 2.3.3.B.20-1. The AMR results for these component types are provided in Table 3.3.2.B-20.

Table 2.3.3.B.20-1
NMP2 Primary Containment Purge System

Component Type	Intended Functions
Debris Screens	Filtration
Piping and Fittings	Pressure Boundary
Valves	Pressure Boundary

2.3.3.B.21 NMP2 PROCESS SAMPLING SYSTEM

System Description

The NMP2 Process Sampling System is designed to monitor selected plant process streams, and provide grab sample points to back up the continuous analyzers and allow laboratory analysis of other process streams. The process sampling system is a water chemistry analysis system involving multipoint sample panels and grab sample sinks in the Reactor Building, Turbine Building, and Radwaste Building. The Process Sampling System consists of the following subsystems: Post Accident Sampling System, Radwaste Building Sampling System, Reactor Plant Sampling System, and Turbine Plant Sampling System. Miscellaneous sample points are provided on individual process systems where needed. Further information on these subsystems is provided below.

The Post Accident Sampling System is designed to obtain representative liquid and gas samples from within the primary containment for radiological analysis in association with the possible consequences of a LOCA. The Radwaste Building Sampling System is used for obtaining grab samples for monitoring the Radioactive Liquid Waste Management and Radwaste Auxiliary Steam System Drain Coolers. The Reactor Plant Sampling System monitors the quality of reactor coolant and various reactor plant fluids. The Turbine Plant Sampling System monitors the quality of reactor grade water flowing in the Turbine Building.

The Process Sampling System consists of the necessary piping, valves, coolers, instrumentation, readouts, alarms, computer points, and analyzers to draw and analyze samples of the various plant process streams. Typically, a sample is piped from the system to the sample panel via an air operated blocking valve. A local sample cooler is used where required. For those samples dependent on temperature, a constant temperature bath is provided at each sample panel. At the panel, the sample is reduced in pressure, as required, by means of a manually operated pressure reducing valve.

This system is in scope for license renewal for the following reason:

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components subject to an AMR for this system include the NSR piping, fittings, and equipment containing liquid in the Decontamination Area (located south of the Radwaste Building), Pipe Tunnel, Reactor Building (secondary containment), Radwaste Building, and Turbine Building.

USAR Reference(s)

More information about the Process Sampling System can be found in USAR Sections 1.2.10.7, 1.10.II.B.3, and 9.3.2.

License Renewal Drawing(s)

None (the only components that are subject to an AMR are NSR piping, fittings, and equipment containing liquid, which are not shown on any license renewal drawings).

Components Subject to an AMR

The component types requiring an AMR for the Process Sampling System and their intended functions are shown in Table 2.3.3.B.21-1. The AMR results for these component types are provided in Table 3.3.2.B-21.

Table 2.3.3.B.21-1
NMP2 Process Sampling System

Component Type	Intended Functions
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment

2.3.3.B.22 NMP2 RADIATION MONITORING SYSTEM

System Description

The NMP2 Radiation Monitoring System is designed to initiate appropriate manual or automatic protective action to limit the potential release of radioactive materials from the reactor vessel, primary and secondary containment, and fuel storage areas if predetermined radiation levels are exceeded in major process/effluent streams, and to provide main control room personnel with radiation level indication throughout the course of an accident. The Radiation Monitoring System consists of a computer-based Digital Radiation Monitoring System, a computer-based Gaseous Effluent Monitoring System, and the Main Steam Line Radiation Monitors. Further information on these systems is provided below.

The Digital Radiation Monitoring System measures, evaluates, and reports radioactivity in process streams and liquid effluents, and annunciates and/or initiates an automatic control function for abnormal system or plant operating conditions. Each monitoring channel has a microprocessor located near the detector or sample panel. The Digital Radiation Monitoring System computer system continuously polls the local microprocessors collecting and storing radiation levels, alarms, and status information for these monitoring channels.

The Gaseous Effluent Monitoring System measures, evaluates, and reports radioactivity in gaseous effluents. It also provides annunciation if release levels approach limits specified in the Offsite Dose Calculation Manual. The Gaseous Effluent Monitoring System also provides real time noble gas isotopic analysis and continuous iodine and particulate sample collection for main stack, Radwaste Building, and Reactor Building vent releases.

The Main Steam Line Radiation Monitoring System monitors the gamma radiation level exterior to the main steam lines. In the event of a gross release of fission products from the core, this monitoring system provides annunciation in the control room. The system consists of four redundant instrument channels. Each channel consists of a local on-line steam detector and a main control room radiation monitor with an auxiliary trip unit for signals to the mechanical vacuum pumps.

Portions of the system consist of off-line gas and liquid monitors which consist of piping, filters, pumps, sampler/detectors, valves, and instruments. Typically, the sample fluid flows from the inlet, past a grab sampler connection, through a pump, and then into the sampler/detector. The sample is returned to the system downstream of the inlet.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

USAR Reference(s)

More information about the Radiation Monitoring System can be found in USAR Sections 11.5.2 and 12.3.4.

License Renewal Drawing(s)

None (see Components Subject to an AMR below)

Components Subject to an AMR

The in-scope mechanical components for the Radiation Monitoring System are active components; therefore, they are not subject to an AMR. The in-scope electrical components for the Radiation Monitoring System are addressed in the NMPNS Electrical Commodities, Section 2.5.C.

2.3.3.B.23 NMP2 REACTOR BUILDING CLOSED LOOP COOLING WATER SYSTEM

System Description

The NMP2 Reactor Building Closed Loop Cooling, (RBCLC) Water System is designed to remove heat from various reactor auxiliary equipment located in the Reactor Building and Turbine Building. The RBCLC Water System is cooled by the Service Water System (Section 2.3.3.B.27), and makeup water is supplied from the Makeup Water System (Section 2.3.3.B.18). The major components of the RBCLC Water System are pumps, piping, heat exchangers, expansion tank, and valves. During normal plant operation, the system provides an intermediate barrier between systems containing radioactive products and the Service Water System, which precludes a direct release of radioactive products into the environment.

The RBCLC Water System is a closed loop system that provides cooling to auxiliary equipment located in the Primary Containment, Reactor Building, and Turbine Building. It consists of a primary loop with three main cooling water pumps, three booster pumps, three heat exchangers, one expansion tank, piping, valves, and instrumentation. A secondary loop dedicated to cooling the instrument air compressors is provided with two pumps, two heat exchangers, an expansion tank, piping, valves, and instrumentation. The secondary loop rejects heat to the primary loop. The RBCLC Water System pumps water through the shell side of its heat exchangers, which are cooled by the Service Water System (Section 2.3.3.B.27). Normally, a combination of any two main pumps, two booster pumps, and two heat exchangers is capable of providing this maximum heat removal capacity with service water temperature up to about 72°F. During normal plant operations, two main pumps, two booster pumps, and two heat exchangers are in operation, and the third main pump, booster pump, and heat exchanger are in standby. The RBCLC Water System branches out to different locations in the plant to supply various loads with cooling water. The water is then returned to the suction of the pumps, completing the system's closed loop.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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) and environmental qualification (10 CFR 50.49).

The components subject to an AMR include piping and fittings and valves associated with RBCLC containment penetrations, the temporary drywell cooling connections, supplies and returns for the Spent Fuel Pool Cooling heat exchangers, and supplies and returns for the residual heat removal pump seal water coolers. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Primary Containment Structure, Reactor Building (secondary containment), and Turbine Building.

USAR Reference(s)

More information about the RBCLC Water System can be found in USAR Section 9.2.2.

License Renewal Drawing(s)

Components requiring an AMR for the RBCLC Water System are highlighted on the following drawings:

- LR-011, Sheet C, Revision 0, Service Water System
- LR-011, Sheet G, Revision 0, Service Water System
- LR-011, Sheet P, Revision 0, Service Water System
- LR-013, Sheet A, Revision 0, Reactor Building Closed Loop Cooling Water
- LR-013, Sheet B, Revision 0, Reactor Building Closed Loop Cooling Water
- LR-013, Sheet C, Revision 0, Reactor Building Closed Loop Cooling Water
- LR-013, Sheet D, Revision 0, Reactor Building Closed Loop Cooling Water
- LR-013, Sheet E, Revision 0, Reactor Building Closed Loop Cooling Water
- LR-031, Sheet E, Revision 0, Residual Heat Removal
- LR-031, Sheet F, Revision 0, Residual Heat Removal

- LR-031, Sheet G, Revision 0, Residual Heat Removal
- LR-038, Sheet C, Revision 0, Fuel Pool Cooling & Clean Up

Components Subject to an AMR

The component types requiring an AMR for the RBCLC Water System and their intended functions are shown in Table 2.3.3.B.23-1. The AMR results for these component types are provided in Table 3.3.2.B-22.

Table 2.3.3.B.23-1
NMP2 Reactor Building Closed Loop Cooling Water System

Component Type	Intended Functions
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Valves	Pressure Boundary

2.3.3.B.24 NMP2 REACTOR BUILDING HVAC SYSTEM

System Description

The NMP2 Reactor Building HVAC System is designed to remove heat generated within the drywell and maintain ambient temperature within design limits, thus providing an environment that ensures optimum performance of equipment. Additionally, the Reactor Building HVAC System is an alternative system for venting the primary containment to the atmosphere, if necessary. The Reactor Building HVAC System consists of the following subsystems: Drywell Cooling, Primary Containment Purge, and All Other Reactor Building Areas.

The NMP2 Drywell Cooling System conditions the air inside the drywell, where unit coolers control drywell temperature and pressure. The Drywell Cooling System consists of unit coolers containing fans, cooling coils, dampers, and controls, together with ductwork and ductwork accessories. Air is drawn from the drywell, circulated through the unit coolers, and returned to the drywell. Cooling water is piped to each cooling coil from the Reactor Building Closed Loop Cooling Water System (Section 2.3.3.B.23). The unit coolers use automatic controls and instrumentation to regulate air temperature.

The Primary Containment Purge subsystem is described in further detail in Section 2.3.3.B.20.

For the All Other Reactor Building Areas subsystem, the supply ventilation air handling unit assembly consists of an air intake, prefilter, filter, heating coil, cooling coil, dampers, controls, and supply fans. Three vaneaxial fans are provided; two operate normally while one is in standby. Ventilation air is exhausted through an exhaust duct network to the exhaust air systems. The system operates in both a normal operation mode and an emergency operation mode. In the normal operation mode, supply air is distributed through ductwork to various areas, including the spent fuel pool area. If the radiation level exceeds a predetermined limit, or a LOCA signal is received, the normal operation mode is automatically shut down and the emergency operation recirculation air system is actuated as well as the unit space coolers. The emergency operation recirculation air system consists of two recirculation unit coolers, together with ductwork and ductwork accessories and controls, arranged to provide recirculation, mixing, and cooling for the reactor building. The emergency recirculation unit cooler takes suction through a network of return air ductwork from each floor level below the refueling floor. Air is recirculated into the Reactor Building through a network of recirculated air ductwork and accessories above the refueling floor to provide entrainment and mixture with the surrounding air.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

- It contains SCs 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) and environmental qualification (10 CFR 50.49).

The components subject to an AMR include Reactor Building general area unit space coolers, Reactor Building isolation dampers, Residual Heat Removal pump room unit space coolers, electrical motor control center area unit space coolers, emergency recirculation unit coolers, Residual Heat Removal heat exchanger room unit space coolers, Low-Pressure Core Spray pump room unit space coolers, High-Pressure Core Spray pump room unit space coolers, Reactor Core Isolation Cooling Pump Room unit space coolers, Standby Gas Treatment Room unit space coolers, above refueling floor radiation sampling subsystems, below refueling floor radiation sampling subsystems, fire dampers, associated ducting, piping and fittings, valves, and dampers.

USAR Reference(s)

More information about the Reactor Building HVAC System can be found in USAR Section 9.4.2.

License Renewal Drawing(s)

Components requiring an AMR for the Reactor Building HVAC System are highlighted on the following drawings:

- LR-052, Sheet A, Revision 0, Rx Building Ventilation & Cat I Area Coolers
- LR-052, Sheet B, Revision 0, Rx Building Ventilation & Cat I Area Coolers
- LR-052, Sheet C, Revision 0, Rx Building Ventilation & Cat I Area Coolers
- LR-052, Sheet D, Revision 0, Rx Building Ventilation & Cat I Area Coolers
- LR-052, Sheet E, Revision 0, Rx Building Ventilation & Cat I Area Coolers
- LR-052, Sheet F, Revision 0, Rx Building Ventilation & Cat I Area Coolers
- LR-052, Sheet G, Revision 0, Rx Building Ventilation & Cat I Area Coolers
- LR-052, Sheet H, Revision 0, Rx Building Ventilation & Cat I Area Coolers

Components Subject to an AMR

The component types requiring an AMR for the Reactor Building HVAC System and their intended functions are shown in Table 2.3.3.B.24-1. The AMR results for these component types are provided in Table 3.3.2.B-23.

Table 2.3.3.B.24-1
NMP2 Reactor Building HVAC System

Component Type	Intended Functions
Bolting	Pressure Boundary
Ducting	Pressure Boundary
Filters/Strainers	Pressure Boundary
Flow Elements	Pressure Boundary
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Radiation Sample Points	Pressure Boundary
Unit Coolers	Heat Transfer, Pressure Boundary
	Pressure Boundary
Valves and Dampers (includes fire dampers)	Pressure Boundary

2.3.3.B.25 NMP2 REACTOR WATER CLEANUP SYSTEM

System Description

The purpose of the NMP2 Reactor Water Cleanup System is to maintain high reactor water quality and remove excess reactor coolant from the RPV during all modes of plant operation. High water quality is maintained to minimize the fouling of heat transfer surfaces and limit impurities available for neutron activation. The Reactor Water Cleanup System provides the means to maintain water chemistry within the limits outlined in Regulatory Guide 1.56, Revision 1. The Reactor Water Cleanup System recirculates a portion of reactor coolant through a filter demineralizer to remove particulate and dissolved impurities from the reactor coolant. It also removes excess coolant from the reactor system under controlled conditions.

The major components of the Reactor Water Cleanup System are located outside the drywell. These components include pumps, regenerative and nonregenerative heat exchangers, filter demineralizers, and associated precoat equipment. Inlet water for the Reactor Water Cleanup System is taken from the RPV via recirculation pump suction lines and the vessel bottom head drain line. The cleanup pumps then pump the inlet water through the tube side of the regenerative and non-regenerative heat exchangers. Flow is normally directed through the filter-demineralizer system and then the shell side of the regenerative heat exchanger before returning to the RPV through the Feedwater System lines (Section 2.3.4.B.3).

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

The components subject to an AMR include safety related piping, valves, flow elements, restriction orifices, and bolting. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Primary Containment Structure and Reactor Building (secondary containment).

USAR Reference(s)

More information about the Reactor Water Cleanup System can be found in USAR Section 5.4.8.

License Renewal Drawing(s)

Components requiring an AMR for the Reactor Water Cleanup System are highlighted on the following drawings:

- LR-037, Sheet A, Revision 0, Reactor Water Cleanup System
- LR-037, Sheet B, Revision 0, Reactor Water Cleanup System

Components Subject to an AMR

The component types requiring an AMR for the Reactor Water Cleanup System and their intended functions are shown in Table 2.3.3.B.25-1. The AMR results for these component types are provided in Table 3.3.2.B-24.

Table 2.3.3.B.25-1
NMP2 Reactor Water Cleanup System

Component Type	Intended Functions
Bolting	Pressure Boundary
Flow Elements	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Orifices	Flow Restriction, Pressure Boundary
Valves	Pressure Boundary

2.3.3.B.26 NMP2 SEAL WATER SYSTEM

System Description

The NMP2 Seal Water System is designed to provide seal water to various pumps in the Radioactive Liquid Waste System (not in scope for license renewal) and the Radioactive Solid Waste System (not in scope for license renewal). Pumps with double mechanical seals in the Radwaste Building are supplied with recirculating, filtered, and cooled seal water. Radwaste pumps in the Reactor Building are supplied with filtered once-through seal water. Seal life is extended by the continuous supply of cool, clean seal water and the water pressure is kept higher than the stuffing box pressure so that process fluid cannot leak out from the pumps. Instrumentation regulates the seal water flow, monitors the condition of the seals via pressure retention, and trips the pumps if the seal water flow is interrupted.

The system consists of storage tanks, pumps, filters, pressure control valves, coolers, piping, and tubing. The seal water pumps take suction at the storage tanks, pump the seal water through filters, and then out to the various seals. When the water returns, it is filtered once again, cooled by the seal water cooler, and finally pumped back into the storage tank. Heat from the system is rejected to the Turbine Building Closed-Loop Cooling Water System (not in scope for license renewal).

This system is in scope for license renewal for the following reason:

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components subject to an AMR for this system include the NSR piping, fittings, and equipment containing liquid in the Reactor Building (secondary containment) and Radwaste Building.

USAR Reference(s)

More information about the Seal Water System can be found in USAR Sections 11.2.1.2, 11.2.2.6.2, and 11.4.3.

License Renewal Drawing(s)

None (the only components that are subject to an AMR are NSR piping, fittings, and equipment containing liquid, which are not shown on any license renewal drawings).

Components Subject to an AMR

The component types requiring an AMR for the Seal Water System and their intended functions are shown in Table 2.3.3.B.26-1. The AMR results for these component types are provided in Table 3.3.2.B-25.

Table 2.3.3.B.26-1
NMP2 Seal Water System

Component Type	Intended Functions
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment

2.3.3.B.27 NMP2 SERVICE WATER SYSTEM

System Description

The NMP2 Service Water System is designed to provide a reliable supply of cooling water for essential components and systems. The Service Water System provides cooling water to the secondary sides of the RBCLC Water System (Section 2.3.3.B.23) and Turbine Building Closed Loop Cooling Water System heat exchangers during normal plant operation and planned outages. Service water is also supplied to the secondary side of the Residual Heat Removal System (Section 2.3.2.B.7) heat exchangers during planned unit outages. In addition, the system is designed to provide makeup water to the Circulating Water System (not in scope for license renewal) and cooling water to miscellaneous nonessential Turbine Building and Reactor Building components during normal plant operation.

The Service Water System at NMP2 is a once-through system which utilizes raw lake water from Lake Ontario. Lake water is provided to the service water pump wells from the intake tunnel through the cooling water channels, passing through trash racks and traveling screens located in the screen and pump house. Six service water pumps take their suction at the pump house, and water is pumped from the intake bay through strainers located in the discharge line of each pump. From the strainers, the service water is directed to a common header in the Screenwell Building. The Service Water system is designed with three loops. Two are essential and one is nonessential. Two takeoffs from the common screenwell header supply service water to the essential Reactor Building components and another takeoff supplies service water to the Turbine Building nonessential components during normal plant operation. Service water return is combined in two separate discharge headers and then returned to the lake.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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) and environmental qualification (10 CFR 50.49).

The components subject to an AMR includes the service water pumps, condensing water pumps and the associated distribution system of piping and fittings, flow orifices, valves, and strainers to the system heat loads. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Auxiliary Service Building, Control Room Building, Diesel Generator Building, Main Steam Tunnel, Reactor Building (secondary containment), Radwaste Building, Screenwell Building, Standby Gas Treatment Building, and Turbine Building.

USAR Reference(s)

More information about the Service Water System can be found in USAR Section 9.2.1.

License Renewal Drawing(s)

Components requiring an AMR for the Service Water System are highlighted on the following drawings:

- LR-011, Sheet A, Revision 0, Service Water System
- LR-011, Sheet B, Revision 0, Service Water System
- LR-011, Sheet C, Revision 0, Service Water System
- LR-011, Sheet D, Revision 0, Service Water System
- LR-011, Sheet E, Revision 0, Service Water System
- LR-011, Sheet F, Revision 0, Service Water System
- LR-011, Sheet G, Revision 0, Service Water System
- LR-011, Sheet H, Revision 0, Service Water System
- LR-011, Sheet J, Revision 0, Service Water System
- LR-011, Sheet L, Revision 0, Service Water System
- LR-011, Sheet M, Revision 0, Service Water System
- LR-011, Sheet P, Revision 0, Service Water System
- LR-011, Sheet Q, Revision 0, Service Water System
- LR-053, Sheet A, Revision 0, Control Building Chilled Water

Components Subject to an AMR

The component types requiring an AMR for the Service Water System and their intended functions are shown in Table 2.3.3.B.27-1. The AMR results for these component types are provided in Table 3.3.2.B-26.

Table 2.3.3.B.27-1
NMP2 Service Water System

Component Type	Intended Functions
Bolting	Pressure Boundary
Filters/Strainers	Filtration, Pressure Boundary
Flow Elements	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Orifices	Flow Restriction, Pressure Boundary
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Temperature Elements	Pressure Boundary
Valves	Pressure Boundary

2.3.3.B.28 NMP2 SPENT FUEL POOL COOLING AND CLEANUP SYSTEM

System Description

The NMP2 Spent Fuel Pool Cooling and Cleanup System is designed to remove the decay heat released from the spent fuel elements and maintain a specified fuel pool water temperature, water clarity, and water level. The Spent Fuel Pool Cooling and Cleanup System is also designed to provide cooling to the spent fuel pool, reactor cavity pool, and reactor internals during plant refueling outages.

The Spent Fuel Pool Cooling and Cleanup System consists of pumps, skimmer surge tanks, heat exchangers, filter/demineralizers, piping, instrumentation, and valves. The cooling section can operate independently from the cleanup section. For cooling, the fuel pool water flows over adjustable weirs into the spent fuel pool skimmer surge tanks. The Spent Fuel Pool Filtering and Cooling System pumps take suction from the skimmer surge tanks and circulate the spent fuel pool water through one or both of the two heat exchangers, where it is cooled by the RBCLC Water System (Section 2.3.3.B.23). The water then returns to the Spent Fuel Pool through spargers located at the bottom of the Spent Fuel Pool. The Service Water System (Section 2.3.3.B.27) can also be used to remove heat from the heat exchangers. For the cleanup loop, the spent fuel pool circulating pumps circulate the water through one or two filter demineralizers arranged in parallel and return it to the spent fuel pool through the diffusers associated with the Spent Fuel Pool Cooling and Cleanup System. The cleanup section of the system can be isolated from the cooling section.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

The components subject to an AMR include the two Spent Fuel Pool water circulating pumps, the two Spent Fuel Pool Cooling water heat exchangers, the two Spent Fuel Pool skimmer surge tanks, and the associated system piping and fittings, strainers, flow orifices, and valves. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Primary Containment Structure, Reactor Building (secondary containment), Radwaste Building, and Screenwell Building.

USAR Reference(s)

More information about the Spent Fuel Pool Cooling and Cleanup System can be found in USAR Section 9.1.3.

License Renewal Drawing(s)

Components requiring an AMR for the Spent Fuel Pool Cooling and Cleanup System are highlighted on the following drawings:

- LR-011, Sheet E, Revision 0, Service Water System
- LR-011, Sheet F, Revision 0, Service Water System

- LR-013, Sheet E, Revision 0, Reactor Building Closed Loop Cooling Water
- LR-017, Sheet G, Revision 0, Sampling System
- LR-031, Sheet A, Revision 0, Residual Heat Removal System
- LR-031, Sheet B, Revision 0, Residual Heat Removal System
- LR-038, Sheet A, Revision 0, Fuel Pool Cooling & Clean Up
- LR-038, Sheet B, Revision 0, Fuel Pool Cooling & Clean Up
- LR-038, Sheet C, Revision 0, Fuel Pool Cooling & Clean Up

Components Subject to an AMR

The component types requiring an AMR for the Spent Fuel Pool Cooling and Cleanup System and their intended functions are shown in Table 2.3.3.B.28-1. The AMR results for these component types are provided in Table 3.3.2.B-27.

Table 2.3.3.B.28-1
NMP2 Spent Fuel Pool Cooling and Cleanup System

Component Type	Intended Functions
Filters/Strainers	Pressure Boundary
Flow Elements	Pressure Boundary
Heat Exchangers	Heat Transfer, Pressure Boundary
	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Orifices	Pressure Boundary
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Tanks	Pressure Boundary
Valves	Pressure Boundary

2.3.3.B.29 NMP2 STANDBY DIESEL GENERATOR FUEL OIL SYSTEM

System Description

The NMP2 Standby Diesel Generator Fuel Oil System is designed to deliver sufficient fuel oil flow to the Emergency Diesel Generators and provide fuel oil storage capacity for each diesel generator for seven days of continuous diesel generator operation without interconnection to any other onsite fuel oil system.

The system consists of tanks, pumps, piping, valves, and strainers. The Emergency Diesel Generators are equipped with a fuel oil day tank, which has enough fuel for approximately one hour of running time plus a margin of ten percent at the highest allowed gravity. The day tank is elevated above the Emergency Diesel Generator and is kept full of fuel oil from the fuel oil storage tank by the fuel oil transfer pumps. The elevated location of the tank provides adequate net positive suction head to the engine-driven fuel pump of the diesel engine. Each storage tank is filled from its own tank truck fill station located in the yard. Electric oil transfer pumps mounted on top of each tank permit the transfer of fuel oil to the day tanks. One fuel oil transfer pump is capable of supplying the maximum fuel demand of a standby diesel generator. Each pump discharges through a strainer with an automatic shutoff in case of high differential pressure. After passing through the strainer, the fuel oil discharges into the day tank.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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).

The components subject to an AMR include the fuel oil transfer pumps, the fuel injection pumps, the engine-driven fuel oil pump, the standby fuel oil pumps, the engine-driven fuel oil booster pumps, the fuel oil coolers, the standby diesel generator fuel oil storage tanks, the High-Pressure Core Spray diesel generator storage tank, the standby diesel generator fuel oil day tanks, the High-Pressure Core Spray diesel generator fuel oil day tank, the fuel pump suction duplex strainers, the pump suction simplex strainers, and the connecting valves and piping and fittings.

USAR Reference(s)

More information about the Standby Diesel Generator Fuel Oil System can be found in USAR Section 9.5.4.

License Renewal Drawing(s)

Components requiring an AMR for the Standby Diesel Generator Fuel Oil System are highlighted on the following drawings:

- LR-066, Sheet B, Revision 0, Miscellaneous Drains
- LR-104, Sheet B, Revision 0, Standby Diesel Gen. System
- LR-104, Sheet C, Revision 0, Standby Diesel Gen. System
- LR-104, Sheet F, Revision 0, Fuel Oil Schematic Standby Diesel Generator System

Components Subject to an AMR

The component types requiring an AMR for the Standby Diesel Generator Fuel Oil System and their intended functions are shown in Table 2.3.3.B.29-1. The AMR results for these component types are provided in Table 3.3.2.B-28.

Table 2.3.3.B.29-1
NMP2 Standby Diesel Generator Fuel Oil System

Component Type	Intended Functions
Bolting	Pressure Boundary
Filters/Strainers	Filtration, Pressure Boundary
Flow Elements	Pressure Boundary
Heat Exchangers	Heat Transfer, Pressure Boundary
	Pressure Boundary
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Tanks	Pressure Boundary
Valves	Pressure Boundary

2.3.3.B.30 NMP2 STANDBY DIESEL GENERATOR PROTECTION (GENERATOR) SYSTEM

System Description

The NMP2 Standby Diesel Generator Protection (Generator) System is designed to provide for the operation of emergency systems and ESFs during and following the shutdown of the reactor when the preferred power supply is not available. The standby power supply system consists of three standby diesel generators. One generator is dedicated to each of the three divisions of the safety-related electric power distribution system feeding each Class 1E load group. Any two of the three standby diesel generators have sufficient capacity to start and supply all needed ESFs and emergency shutdown loads in case of a LOCA and/or Loss-of-Offsite Power (LOOP).

The Emergency Diesel Generators are normally maintained in a standby status. In case of a LOOP, or degraded offsite voltage condition, the Emergency Diesel Generators automatically start, accelerate to rated speed and voltage, and start picking up loads sequentially. In case of a LOCA, the Emergency Diesel Generators automatically start, accelerate to rated speed, voltage, and frequency, and run unloaded. Should any subsequent LOOP occur, the Emergency Diesel Generators would then energize their respective busses. The Standby Diesel Generator Protection (Generator) System also includes the generator support systems for cooling water and lube oil, which are discussed in the Generator Standby Lube Oil System (Section 2.3.3.B.15).

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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).

The components subject to an AMR include the jacket water pumps, the jacket water heat exchangers, lubrication oil coolers, intercoolers, and the associated system piping, fittings, and valves associated with the Division I, II, and III Emergency Diesel Generators.

USAR Reference(s)

More information about the Standby Diesel Generator Protection (Generator) System can be found in USAR Sections 1.2.9.17 and 8.3.1.

License Renewal Drawing(s)

Components requiring an AMR for the Standby Diesel Generator Protection (Generator) System are highlighted on the following drawings:

- LR-104, Sheet D, Revision 0, Jacket Water Standby Diesel Generator System
- LR-104, Sheet E, Revision 0, Lube Oil Standby Diesel Generator System
- LR-104, Sheet F, Revision 0, Fuel Oil Schematic Standby Diesel Generator System
- Components Subject to an AMR

The component types requiring an AMR for the Standby Diesel Generator Protection (Generator) System and their intended functions are shown in Table 2.3.3.B.30-1. The AMR results for these component types are provided in Table 3.3.2.B-29.

Table 2.3.3.B.30-1
NMP2 Standby Diesel Generator Protection (Generator) System

Component Type	Intended Functions
Bolting	Pressure Boundary
Heat Exchangers	Heat Transfer, Pressure Boundary
	Pressure Boundary
Piping and Fittings	Pressure Boundary
Pumps	Pressure Boundary
Valves	Pressure Boundary

2.3.3.B.31 NMP2 STANDBY LIQUID CONTROL SYSTEM

System Description

The NMP2 Standby Liquid Control System is designed to inject a boron solution into the reactor when needed to bring the core to a subcritical condition. This provides an alternate method to shutdown the reactor in the event that sufficient control rods cannot be inserted in the reactor core to accomplish shutdown and cool down in the normal manner. This system is designed to provide sufficient negative reactivity to shut down the reactor and keep the reactor from going critical as it cools by mixing a neutron absorber with the primary reactor coolant. The neutron absorber is injected within the core zone via the High Pressure Core Spray System (Section 2.3.2.B.3) injection line. The Standby Liquid Control System can be initiated manually or automatically by the Redundant Reactivity Control System (Section 2.5.B.19).

The Standby Liquid Control System consists of a boron solution tank, test water tank, two positive displacement pumps, two explosive valves, two motor-operated pump suction valves, and associated local valves and controls. The pumps take suction on the boron tank and inject the solution through the explosive valves and from there directly into the high pressure core spray line downstream of the inboard containment isolation check valve. The sodium pentaborate solution is discharged radially over the top of the core through the high pressure core spray sparger.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for anticipated transients without scram (10 CFR 50.62).

The components subject to an AMR include the boron solution tank and inlet piping and valves for the sodium pentaborate; positive displacement pumps; explosive valves; motor-operated pump suction valves; and all associated piping, expansion joints, and valves between the boron solution tank and the reactor vessel.

USAR Reference(s)

More information about the Standby Liquid Control System can be found in USAR Section 9.3.5.

License Renewal Drawing

Components requiring an AMR for the Standby Liquid Control System are highlighted on the following drawing:

- LR-036, Sheet A, Revision 0, Standby Liquid Control

Components Subject to an AMR

The component types requiring an AMR for the Standby Liquid Control System and their intended functions are shown in Table 2.3.3.B.31-1. The AMR results for these component types are provided in Table 3.3.2.B-30.

Table 2.3.3.B.31-1
NMP2 Standby Liquid Control System

Component Type	Intended Functions
Filters/Strainers	Pressure Boundary
Flow Elements	Pressure Boundary
Piping and Fittings	NSR Functional Support
	Pressure Boundary
Pumps	Pressure Boundary
Orifices	Flow Restriction, Pressure Boundary
Tanks	Pressure Boundary
Temperature Elements	Pressure Boundary
Valves	NSR Functional Support
	Pressure Boundary

2.3.3.B.32 NMP2 YARD STRUCTURES VENTILATION SYSTEM

System Description

The NMP2 Yard Structures Ventilation System is designed to provide heating and outside air ventilation for the Service Water pump bays, Screenwell Building, fire pump rooms, Demineralizer Water Storage Tank Building, Condensate Storage Tank Building, electrical bay, screenhouse, and Chiller Building. Each of the Service Water pump bays is also equipped with redundant unit coolers which maintain the space temperature within design limits by rejecting heat to the Service Water System (Section 2.3.3.B.27). The Yard Structures Ventilation System also provides space cooling to the Service Water pump bays ensuring and the ambient temperature remains within the pump operating design limits.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).

- It contains SCs 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) and environmental qualification (10 CFR 50.49).

The components subject to an AMR include the fan and cooling unit housings, the ducting, damper housings for the ventilation system in the Service Water Pump Bays in the Screenwell Building, and the fire dampers in the Screenwell Building, the Auxiliary Boiler Building, the Demineralized Water Storage Tank Building, and the Diesel Fire Pump Room.

USAR Reference(s)

More information about the Yard Structures Ventilation System can be found in USAR Section 9B.4.4.3.4.

License Renewal Drawing(s)

Components requiring an AMR for the Yard Structures Ventilation System are highlighted on the following drawings:

- LR-011, Sheet M, Revision 0, Service Water System Piping and Instrument Diagram

- LR-058, Sheet A, Revision 0, Screenwell & Diesel Fire Pump Room Vent

- LR-058, Sheet B, Revision 0, Screenwell & Diesel Fire Pump Room Vent

Components Subject to an AMR

The component types requiring an AMR for the Yard Structures Ventilation System and their intended functions are shown in Table 2.3.3.B.32-1. The AMR results for these component types are provided in Table 3.3.2.B-31.

Table 2.3.3.B.32-1
NMP2 Yard Structures Ventilation System

Component Type	Intended Functions
Blowers	Pressure Boundary
Dampers (includes fire dampers)	NSR Functional Support
	Pressure Boundary
Ducting	Pressure Boundary
Unit Coolers	Heat Transfer, Pressure Boundary
	Pressure Boundary

2.3.4 STEAM AND POWER CONVERSION SYSTEMS

The NMP1 and NMP2 Steam and Power Conversion Systems are described in Sections 2.3.4.A and 2.3.4.B, respectively.

2.3.4.A NMP1 STEAM AND POWER CONVERSION SYSTEMS

The NMP1 Steam and Power Conversion Systems transfer steam from the reactor, convert it to the plant's electrical output, and return water to the Reactor Pressure Vessel (RPV). The following systems are included in this subsection.

- NMP1 Condensate and Condensate Transfer System (Section 2.3.4.A.1)
- NMP1 Condenser Air Removal and Off-Gas System (Section 2.3.4.A.2)
- NMP1 Feedwater/High Pressure Coolant Injection System (Section 2.3.4.A.3)
- NMP1 Main Generator and Auxiliary System (Section 2.3.4.A.4)
- NMP1 Main Steam System (Section 2.3.4.A.5)

2.3.4.A.1 NMP1 CONDENSATE AND CONDENSATE TRANSFER SYSTEM

System Description

The NMP1 Condensate System condenses steam exhausted from the low-pressure turbines and the turbine bypass valves. This condensate then becomes the primary water supply to the Feedwater/High Pressure Coolant Injection (FW/HPCI) System (Section 2.3.4.A.3). The main condenser also acts as a collecting basin for various leakage, drains, and relief valve discharges from balance of plant systems. The Condensate System also removes impurities from the condensed liquid for re-use as reactor water. The condensate serves as a cooling medium for the Off Gas System Steam Jet Air Ejector condensers, steam entering the condenser when the turbine bypass valves are open, and the turbine exhaust hood spray. Additionally, under emergency conditions such as a small break LOCA, the Condensate System supplies water from the main condenser to support the HPCI mode of operation to supply makeup water to the reactor.

The Condensate System consists of piping, valves, pumps, heat exchangers, controls, instrumentation, and associated equipment that supply condensate to the FW/HPCI System. The condensate pumps take suction from the condenser hotwell and discharge it through the Condensate Demineralizer

System, the Steam Jet Air Ejector intercondenser, and the recombiner condensers into the FW booster pumps.

For license renewal purposes, the Condensate System also includes the Condensate Transfer System. The Condensate Transfer System supplies various systems and equipment throughout the plant with clean demineralized water. The Condensate Transfer System takes condensate from the Condensate Storage Tanks (CSTs), which are cross-connected, and delivers the water through one of two redundant pumps.

The Condensate and Condensate Transfer System is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49) and station blackout (10 CFR 50.63).

The portion of the Condensate and Condensate Transfer System containing components subject to AMR begins at the main condenser and includes the main flowpath through the suction piping for the condensate pumps and the condensate pump discharge piping, ending at the boundary of the Feedwater System. The condensate demineralizers and associated piping to, and from, the main condensate flowpath are also subject to AMR. Condensate Transfer piping supplying demineralized water to various systems is also subject to AMR. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Reactor Building, Radwaste Solidification and Storage Building, Screen and Pump House Building, Turbine Building, and Waste Disposal Building.

USAR Reference(s)

More information about the Condensate and Condensate Transfer System can be found in USAR Section XI.B.

License Renewal Drawings

Components requiring an AMR for the Condensate and Condensate Transfer System are highlighted on the following drawings:

- LR-18003-C, Revision 0, Condensate Flow
- LR-18006-C, Sheet 2, Revision 0, Drywell & Torus, Isolation & Blocking Valves
- LR-18008-C, Revision 0, Spent Fuel Storage Pool, Filtering and Cooling System
- LR-18009-C, Sheet 1, Revision 0, Reactor Clean-Up System
- LR-18009-C, Sheet 2, Revision 0, Reactor Clean-Up System
- LR-18010-C, Sheet 2, Revision 0, Off Gas System, Recombiner Section
- LR-18029-C, Revision 0, Condenser Connections, Condenser Spray & Water Box
- LR-18033-C, Sheet 1, Revision 0, Condensate Demineralizer System
- LR-18035-C, Revision 0, Resin Transfer Regeneration
- LR-18036-C, Revision 0, Sealing Water for Turbine Bldg., Waste Bldg., Reactor Bldg. & Screen House
- LR-18041-C, Sheet 1, Revision 0, Sampling Points, Main Steam, Feedwater & Condensate
- LR-18048-C, Revision 0, Condensate Transfer System, Pump Discharge
- LR-45136-C, Sheet 1, Revision 0, Instrumentation, Valve Schedule
- LR-45136-C, Sheet 3A, Revision 0, Instrumentation, Valve Schedule
- LR-45136-C, Sheet 4, Revision 0, Instrumentation Valve Schedule
- LR-69003-C, Sheet 2, Revision 0, Cond. Hotwell Lvl Turb. Bldg. El. 243'-0" Instr. Diagram

- LR-69003-C, Sheet 3, Revision 0, Cond. Hotwell Lvl (North) Turb. Bldg. El. 243'-0" Instr. Diagram

Components Subject to an AMR

The component types requiring an AMR for the Condensate and Condensate Transfer System and their intended functions are shown in Table 2.3.4.A.1-1. The AMR results for these component types are provided in Table 3.4.2.A-1.

Table 2.3.4.A.1-1
NMP1 Condensate and Condensate Transfer System

Component Type	Intended Functions
Condensate Demineralizers	NSR Functional Support
Filters/Strainers	NSR Functional Support
Flow Elements	NSR Functional Support
Flow Gauges	Pressure Boundary
Flow Indicators	Pressure Boundary
Flow Orifices	Pressure Boundary
Level Observation Glasses	NSR Functional Support
Main Condenser	NSR Functional Support
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	NSR Functional Support
	Pressure Boundary
Pumps	NSR Functional Support
	Pressure Boundary
Tanks	Pressure Boundary
Valves	NSR Functional Support
	Pressure Boundary

2.3.4.A.2 NMP1 CONDENSER AIR REMOVAL AND OFF-GAS SYSTEM

System Description

The NMP1 Condenser Air Removal and Off-Gas System remove non-condensable radioactive gases that accumulate in the main condenser during plant startup and normal operation. The gases evacuated by this system are mainly concentrated in the condenser, but steam, air, and other gases evacuated by the steam packing exhauster are also discharged to the Condenser Air Removal and Off-Gas System.

The Condenser Air Removal and Off-Gas System draws a suction from the air volume in the main condenser, processes the gases and exhausts the gases to the main stack. The processing of the non-condensable radioactive gases includes recombining the hydrogen and oxygen gases to form water, removing the moisture content of the gases and providing for radioactive decay so as to minimize the level of radiation exhausted to the main stack. This system also includes equipment to draw the initial vacuum on the main condenser during plant startup. The water removed by the processing of the condenser air is returned to the main condenser.

This system is in scope for license renewal for the following reason:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

USAR Reference(s)

More information about the Condenser Air Removal and Off-Gas System can be found in USAR Section XI.B.3.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

The components for the Condenser Air Removal and Off-Gas System are either active or subject to replacement based on qualified life or specified time period. Therefore, there are no components requiring an AMR for the Condenser Air Removal and Off-Gas System.

2.3.4.A.3 NMP1 FEEDWATER/HIGH PRESSURE COOLANT INJECTION SYSTEM

System Description

The NMP1 Feedwater/High Pressure Coolant Injection System (FW/HPCI) is the main source of processed water to the reactor during normal operation and also is designed to ensure that the core is adequately cooled under small break LOCA conditions, which do not result in a rapid depressurization of the RPV. The primary function of the FW System is to transfer the water from the Condensate System (Section 2.3.4.A.1) to the RPV. The FW System also preheats the feedwater prior to entering the RPV. The HPCI System is an operating mode of the FW system. The purpose of the HPCI System is to provide adequate cooling of the reactor core under abnormal and accident conditions, remove the heat from radioactive decay and residual heat from the reactor core at such a rate that fuel clad melting would be prevented, and provide for continuity of core cooling over the complete range of postulated break sizes in the primary system process barrier.

The FW System consists of three feedwater booster pumps, three trains of high and low pressure feedwater heaters, three feedwater pumps with associated flow control valves, two injection paths to the RPV which contain isolation valves and two feedwater spargers located within the RPV. The feedwater booster pumps take suction from the Condensate System (Section 2.3.4.A.1). Minimum flow lines are connected to the discharge of each pump to provide pump protection. The diesel fire pump can be connected to the feedwater pump discharge header through a spool piece for Station Blackout and Appendix R fire scenarios. The Reactor Water Cleanup System (Section 2.3.3.A.19) discharge is connected to the feedwater injection lines between the inboard isolation valve and the RPV.

The HPCI System is an operating mode of the FW System. It utilizes the following components to fulfill its functions: the two condensate storage tanks, the main condenser hotwell, two condensate pumps, condensate demineralizers, two feedwater booster pumps, feedwater heaters, two motor-driven feedwater pumps, an integrated control system and associated piping and valves. Upon initiation, the HPCI System provides the control functions to deliver water from the condensate storage tanks to the RPV. However, the HPCI System is not an engineered safeguards system and is not considered in any LOCA analyses.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), and station blackout (10 CFR 50.63).

The portion of the FW/HPCI System containing components subject to AMR begins at the interface with the Condensate System piping, and includes the feedwater booster pump suction and discharge piping, tube side of the low pressure feedwater heaters, feedwater pump suction and discharge piping, tube side of the high pressure feedwater heaters, isolation valves and piping ending at the RPV. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid in the Turbine Building.

USAR Reference(s)

More information about the FW/HPCI System can be found in USAR Sections VII.I and XI.B.

License Renewal Drawings

Components requiring an AMR for the FW/HPCI System are highlighted on the following drawings:

- LR-18003-C, Revision 0, Condensate Flow
- LR-18004-C, Revision 0, Feed Water Flow, Low Pressure
- LR-18005-C, Sheet 1, Revision 0, Feed Water Flow, High Pressure
- LR-18005-C, Sheet 2, Revision 0, Feed Water Flow, High Pressure
- LR-18006-C, Sheet 1, Revision 0, Drywell & Torus, Isolation Valves
- LR-18023-C, Sheet 2, Revision 0, Motor Driven RFW Pump #11 & 12, Gear & Motor Oil
- LR-18024-C, Revision 0, Feedwater Heaters Misc., Vents and Drains
- LR-18041-C, Sheet 1, Revision 0, Sampling Points, Main Steam, Feedwater & Condensate

- LR-45136-C, Sheet 4, Revision 0, Instrumentation Valve Schedule
- LR-69005-C, Sheet 3, Revision 0, Instrument Diagram
- LR-69023-C, Sheet 1, Revision 0, RFW PMP #11 Lube oil pressure instrument diagram
- LR-69023-C, Sheet 2, Revision 0, RFW PMP #12 Lube oil pressure instrument diagram

Components Subject to an AMR

The component types requiring an AMR for the FW/HPCI System and their intended functions are shown in Table 2.3.4.A.3-1. The AMR results for these component types are provided in Table 3.4.2.A-2.

Table 2.3.4.A.3-1
NMP1 Feedwater/High Pressure Coolant Injection System

Component Type	Intended Functions
Bolting	NSR Functional Support
	Pressure Boundary
Feedwater Heaters	NSR Functional Support
Filters/Strainers	NSR Functional Support
Flow Elements	NSR Functional Support
Flow Indicators	NSR Functional Support
Flow Orifices	NSR Functional Support
Oil Coolers	NSR Functional Support
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	NSR Functional Support
	Pressure Boundary
Pumps	NSR Functional Support
Valves	NSR Functional Support
	Pressure Boundary

2.3.4.A.4 NMP1 MAIN GENERATOR AND AUXILIARY SYSTEM

System Description

The NMP1 Main Generator and Auxiliary System consists of the main generator, generator stator cooling water system, hydrogen seal oil system and hydrogen cooling system. The hydrogen cooling system fills the main generator with high-purity hydrogen gas to cool the generator during plant operation. The main generator is filled with hydrogen gas by first purging air with carbon dioxide and then purging the carbon dioxide with hydrogen.

The equipment used to supply carbon dioxide to the main generator is the only equipment of the Main Generator and Auxiliary System that is in scope for license renewal. This equipment consists of tanks, piping and valves.

This system is in scope for license renewal for the following reason:

- It contains SCs 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).

Components subject to AMR extend from the carbon dioxide storage tank, and include piping up to and including the hazard blocking valves, or in some cases, a nozzle just downstream of the hazard blocking valve.

USAR Reference(s)

More information about the Main Generator and Auxiliary System can be found in USAR Section XI.B.1.

License Renewal Drawings

Components requiring an AMR for the Main Generator and Auxiliary System are highlighted on the following drawings:

- LR-18039-C, Sheet 1, Revision 0, Generator, H2 and CO2 Systems
- LR-18039-C, Sheet 2, Revision 0, Cardox Fire Extinguishing System
- LR-18039-C, Sheet 3, Revision 0, Cardox Fire Extinguishing System

Components Subject to an AMR

The component types requiring an AMR for the Main Generator and Auxiliary System and their intended functions are shown in Table 2.3.4.A.4-1. The AMR results for these component types are provided in Table 3.4.2.A-3.

Table 2.3.4.A.4-1
NMP1 Main Generator and Auxiliary System

Component Type	Intended Functions
Bolting	NSR Functional Support
Piping and Fittings	NSR Functional Support
Tanks	NSR Functional Support
Valves	NSR Functional Support

2.3.4.A.5 NMP1 MAIN STEAM SYSTEM

System Description

The NMP1 Main Steam System supplies dry steam from the RPV to the main turbine and to various support systems. The Main Steam System consists of two main steam lines, four main steam isolation valves, six electromatic relief valves, four turbine stop valves, four turbine control valves, nine turbine bypass valves, controls, instrumentation, piping, valves and associated equipment. The system extends from the RPV main steam nozzles to the turbine stop, control and bypass valves and to the inlet of the various components it supplies steam to. The discharge piping and valves from the electromatic relief valves to the torus are also included within this system. The electromatic relief valves are also used by the Automatic Depressurization System (Section 2.3.2.A.1) to depressurize the RPV during accident conditions.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), and station blackout (10 CFR 50.63).

The portion of the Main Steam System containing components subject to AMR begins immediately downstream of the RPV main steam outlet nozzles and includes piping downstream to, and including, the MSIVs. Branch connection piping from the main steam lines through the Electromatic Relief Valves (ERVs) to the torus is also subject to AMR. Additionally, instrumentation piping connected to the main steam piping inside primary containment and an instrument line connected to the high pressure turbine, are subject to AMR. The instrumentation line components subject to AMR end at blocking valves separating the instrumentation piping from the Reactor Building equipment drain tank piping or Turbine Building equipment drain tank piping. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid and/or steam in the drywell and Turbine Building.

USAR Reference(s)

More information about the Main Steam System can be found in USAR Sections V.B.1, V.B.5, and XI.B.1.

License Renewal Drawings

Components requiring an AMR for the Main Steam System are highlighted on the following drawings:

- LR-18002-C, Sheet 1, Revision 0, Steam Flow, Main Steam & High Press. Turbine
- LR-69002-C, Sheet 1, Revision 0, Main Steam Flow Instrumentation, North Instrument Room R.B. El. 237'-0", Instrument Diagram
- LR-69002-C, Sheet 2, Revision 0, Main Steam Flow Instrumentation, North Instrument Room R.B. El. 237'-0", Instrument Diagram
- LR-69002-C, Sheet 3, Revision 0, Turbine First Stage Steam Press Turbine Building El. 277'-0" & 250'-0" Instrument Diagram

Components Subject to an AMR

The component types requiring an AMR for the Main Steam System and their intended functions are shown in Table 2.3.4.A.5-1. This also includes component types requiring an AMR for the Automatic Depressurization System. The AMR results for these component types are provided in Table 3.4.2.A-4.

Table 2.3.4.A.5-1
NMP1 Main Steam System

Component Type	Intended Functions
Bolting	Pressure Boundary
Condensing Pots	Pressure Boundary
Flow Elements	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Valves	Pressure Boundary

2.3.4.B NMP2 STEAM AND POWER CONVERSION SYSTEMS

The NMP2 Steam and Power Conversion Systems transfer steam from the reactor, convert it to the plant's electrical output, and return water to the RPV. The following systems are included in this subsection.

- NMP2 Main Condenser Air Removal System (Section 2.3.4.B.1)
- NMP2 Condensate System (Section 2.3.4.B.2)
- NMP2 Feedwater System (Section 2.3.4.B.3)
- NMP2 Main Steam System (Section 2.3.4.B.4)
- NMP2 Moisture Separator and Reheater System (Section 2.3.4.B.5)

2.3.4.B.1 NMP2 MAIN CONDENSER AIR REMOVAL SYSTEM

System Description

The purpose of the NMP2 Main Condenser Air Removal System is to establish and maintain a main condenser vacuum by removing air and non-condensible gases from the main condenser. This system consists of two subsystems. The Hogging subsystem is used to establish condenser vacuum during plant startup. The Holding subsystem is used to maintain condenser vacuum during normal plant operations. The Hogging subsystem consists of vacuum pumps, seal water cooler, piping, valves, and instrumentation. The Holding subsystem consists of two trains. Each train consists of a precooler, Steam Jet Air Ejectors, an intercondenser, piping, valves, and instrumentation.

The Main Condenser Air Removal System is in scope for license renewal for the following reason:

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components subject to an AMR for this system include the NSR piping, fittings, and equipment containing liquid in the Pipe Tunnel and Turbine Building.

USAR Reference(s)

More information about the Main Condenser Air Removal System can be found in USAR Section 10.4.2.

License Renewal Drawing(s)

None; (the only components that are subject to an AMR are NSR piping, fittings, and equipment containing liquid, which are not shown on any license renewal drawings).

Components Subject to an AMR

Components requiring an AMR for the Main Condenser Air Removal System and their intended functions are shown in Table 2.3.4.B.1-1. The AMR results for these component types are provided in Table 3.4.2.B-1.

Table 2.3.4.B.1-1
NMP2 Main Condenser Air Removal System

Component Type	Intended Functions
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment

2.3.4.B.2 NMP2 CONDENSATE SYSTEM

System Description

The NMP2 Condensate System provides a reliable supply of condensate to the feedwater system. The Condensate System consists of the main condenser, three condensate pumps, three condensate booster pumps, three trains of drain coolers and low pressure heaters, controls, instrumentation, piping, valves and associated equipment to supply the Feedwater System with heated, high quality condensate. The system extends from the main condenser to the low pressure heaters discharge header and includes flow through the condensate demineralizers, steam jet air ejector intercondensers and turbine glad steam exhausters.

For license renewal purposes the Condensate System also includes the following systems: Condensate Makeup and Drawoff System, Condensate Demineralizer System, Condensate Demineralizer System – Mixed Bed System, Condensate Booster Pump Lube Oil System, and Auxiliary Condensate System. Further information on these systems is provided below.

The Condensate Makeup and Drawoff System provides makeup water to various systems in the plant, serves as a source of water during refueling operations, serves as reserve for the Reactor Core Isolation Cooling System (Section 2.3.2.B.6) and the High-Pressure Core Spray System (Section 2.3.2.B.3), and provides for condenser hotwell level control. The Condensate Demineralizer System and Condensate Demineralizer System – Mixed Bed System are designed to maintain reactor feedwater purity by the removal of soluble and insoluble impurities from the condensate. They also provide a means of cleaning the condensate resins. The Condensate Booster Pump Lube Oil System provides lubricating oil to the condensate booster pump seals. The Auxiliary Condensate System provides level controls and condensate removal functions for systems, structures, and components that are supplied with auxiliary steam.

The Condensate System is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

The portions of the Condensate System containing components subject to AMR include the CSTs, piping and expansion joints connected to the CST up to and including the first outboard valve, piping from the main condensers to pressure transmitters, and one check valve. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid and/or steam in the Pipe Tunnel and Reactor Building.

USAR Reference(s)

More information about the Condensate System can be found in USAR Sections 9.2.6, 10.4.1, 10.4.6, and 10.4.7.

License Renewal Drawings

Components requiring an AMR for the Condensate System are highlighted on the following drawings:

- LR-003, Sheet A, Revision 0, Condensate System
- LR-004, Sheet A, Revision 0, Condensate Storage and Transfer
- LR-004, Sheet B, Revision 0, Condensate Makeup and Transfer
- LR-033, Sheet B, Revision 0, High Pressure Core Spray System
- LR-035, Sheet D, Revision 0, Reactor Core Isolation Cooling

Components Subject to an AMR

The component types requiring an AMR for the Condensate System and their intended functions are shown in Table 2.3.4.B.2-1. The AMR results for these component types are provided in Table 3.4.2.B-2.

Table 2.3.4.B.2-1
NMP2 Condensate System

Component Type	Intended Functions
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	NSR Functional Support
	Pressure Boundary
Tanks	NSR Functional Support
Valves	NSR Functional Support
	Pressure Boundary

2.3.4.B.3 NMP2 FEEDWATER SYSTEM

System Description

The NMP2 Feedwater (FW) System provides a reliable supply of feedwater to the reactor at the temperature, pressure, quality, and flow rate required by the reactor. The FW System consists of three feedwater pumps, three sixth point feedwater heaters, controls, instrumentation, piping, valves, and associated equipment to supply the reactor with heated, high quality feedwater. The system extends from the low pressure heater strings discharge header to the RPV feedwater inlet penetrations. Connections from the zinc injection passivation system are provided on both the suction and discharge to the feedwater pumps. The Reactor Water Cleanup System (Section 2.3.3.B.25) also connects to the FW System between the feedwater heaters and system isolation valves.

For license renewal purposes the FW System also includes the following systems: Feedwater Pump Seals and Leakoff System, Feedwater Pump Recirculation Balance Drum Leakoff System, and Feedwater Pump Drive Lube Oil System. Further information on these systems is provided below.

The Feedwater Pump Seals and Leakoff System provides seal water to the pump mechanical seals from the condensate booster pump discharge. The seal water minimizes pump mechanical seal leakage and cools the pump seals to minimize seal degradation. The Feedwater Pump Recirculation Balance Drum Leakoff System provides minimum flow protection for each feedwater pump via a recirculation line to the main condenser. The Feedwater Pump Drive Lube Oil System provides lube oil to the reactor feed pumps.

The FW System is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49) and anticipated transients without scram (10 CFR 50.62).

The portion of the FW System containing components subject to AMR begins at the motor-operated containment isolation valves, and includes piping downstream to the reactor vessel feedwater nozzles. Branch connection piping for the return of water from the Reactor Water Cleanup System (Section 2.3.3.B.25) is also subject to AMR. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid and/or steam in the Main Steam Tunnel and Turbine Building.

USAR Reference(s)

More information about the FW System can be found in USAR Section 10.4.7.

License Renewal Drawings

Components requiring an AMR for the FW System are highlighted on the following drawings:

- LR-006, Sheet A, Revision 0, Feedwater System
- LR-006, Sheet B, Revision 0, Feedwater System
- LR-037, Sheet B, Revision 0, Reactor Water Cleanup System

Components Subject to an AMR

The component types requiring an AMR for the FW System and their intended functions are shown in Table 2.3.4.B.3-1. The AMR results for these component types are provided in Table 3.4.2.B-3.

Table 2.3.4.B.3-1
NMP2 Feedwater System

Component Type	Intended Functions
Bolting	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Valves	NSR Functional Support
	Pressure Boundary

2.3.4.B.4 NMP2 MAIN STEAM SYSTEM

System Description

The NMP2 Main Steam System provides high pressure steam from the RPV to the main turbine and the reheating side of the moisture separator/reheater. The Main Steam System also provides steam to the Reactor Core Isolation Cooling System (Section 2.3.2.B.6) for operation of its turbine-driven pump. The Main Steam System consists of four main steam lines, eight main steam isolation valves, eighteen safety relief valves, controls, instrumentation, piping, valves and associated equipment. The system extends from the RPV main steam nozzles to the inlet of the above stated loads, and from the safety relief valve discharge to the suppression pool. Seven of the safety relief valves are used by the Automatic Depressurization System (Section 2.3.2.B.1) to depressurize the RPV during accident conditions.

For license renewal purposes the Main Steam System also includes the Auxiliary Steam System and the Main Steam Safety Valves Vents and Drains System. Further information on these systems is provided below.

The Auxiliary Steam System provides reduced pressure steam to the steam jet air ejectors, offgas preheaters, clean steam reboiler, building heating intermediate heat exchanger, and is the backup steam supply for the turbine gland seal system. The Main Steam Safety Valves Vents and Drains System directs high pressure steam from the safety relief valves to the suppression pool.

The Main Steam System is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), and station blackout (10 CFR 50.63).

The portion of the Main Steam System containing components subject to AMR begins immediately outboard of the RPV Main Steam outlet nozzles, and ends at the outer MSIVs. Branch connection piping from the Main Steam lines to the main steam safety valves, discharging to the suppression pool, is subject to AMR along with its associated components. The components subject to an AMR for this system also include the NSR piping, fittings, and equipment containing liquid and/or steam in the Main Steam Tunnel, Reactor Building, and Turbine Building.

USAR Reference(s)

More information about the Main Steam System can be found in USAR Sections 5.2.2, 5.4, and 10.3.

License Renewal Drawings

Components requiring an AMR for the Main Steam System are highlighted on the following drawings:

- LR-001, Sheet A, Revision 0, Main Steam
- LR-001, Sheet B, Revision 0, Main Steam
- LR-001, Sheet C, Revision 0, Main Steam
- LR-001, Sheet D, Revision 0, Main Steam
- LR-001, Sheet E, Revision 0, Main Steam
- LR-001, Sheet F, Revision 0, Main Steam
- LR-001, Sheet J, Revision 0, Main Steam

Components Subject to an AMR

The component types requiring an AMR for the Main Steam System and their intended functions are shown in Table 2.3.4.B.4-1. This also includes components requiring an AMR for the Automatic Depressurization System. The AMR results for these component types are provided in Table 3.4.2.B-4.

Table 2.3.4.B.4-1
NMP2 Main Steam System

Component Type	Intended Functions
“T” Quenchers	Pressure Boundary
Bolting	Pressure Boundary
Condensing Chambers	Pressure Boundary
Flexible Hose	Pressure Boundary
Flow Elements	Pressure Boundary
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment
Piping and Fittings	Pressure Boundary
Restriction Orifices	Flow Restriction, Pressure Boundary
Valves	Pressure Boundary

2.3.4.B.5 NMP2 MOISTURE SEPARATOR AND REHEATER SYSTEM

System Description

The NMP2 Moisture Separator and Reheater System removes entrained moisture from the high pressure turbine exhaust and reheats the dried steam to superheated conditions before it passes on to the low pressure turbine. The Moisture Separator and Reheater System consists of two moisture separator reheaters, two reheater drain tanks, controls, instrumentation, piping, valves and associated equipment. The system extends from the high pressure turbine exhaust lines, through the moisture separator reheaters, to the low pressure turbine inlet lines, and forth-point feedwater heaters and from the main steam equaling header, through the moisture separator reheaters and reheater drain tanks, to the drain lines to the main condenser and high pressure feedwater heaters.

The Moisture Separator and Reheater System, as described above, encompasses the Cold Reheat Steam, Hot Reheat Steam, Moisture Separator and Reheater Vents, and Moisture Separator Vents and Drains Systems.

This system is in scope for license renewal for the following reason:

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components subject to an AMR for this system include the NSR piping, fittings, and equipment containing liquid and/or steam in the Reactor Building and Turbine Building.

USAR Reference(s)

More information about the Moisture Separator and Reheater System can be found in USAR Sections 10.1 and 10.2.2.1.

License Renewal Drawing(s)

None; (the only components that are subject to an AMR are NSR piping, fittings, and equipment containing liquid and/or steam, which are not shown on any license renewal drawings).

Components Subject to an AMR

Components requiring an AMR for the Moisture Separator and Reheater System and their intended functions are shown in Table 2.3.4.B.5-1. The AMR results for these component types are provided in Table 3.4.2.B-5.

Table 2.3.4.B.5-1
NMP2 Moisture Separator and Reheater System

Component Type	Intended Functions
NSR piping, fittings, and equipment	Prevent Failure from Affecting SR Equipment

2.4 SCOPING AND SCREENING RESULTS: STRUCTURES AND COMPONENT SUPPORTS

The determination of structures and component supports within the scope of license renewal is made by initially identifying NMPNS structures and their design functions. Each structure is then reviewed to determine those that satisfy one or more of the criteria contained in 10 CFR 54.4. This process is described in Section 2.1 and the results of the structures review are included in Section 2.2. Section 2.1 also provides the methodology for determining the components within the scope of 10 CFR 54.4 that meet the requirements contained in 10 CFR 54.21(a)(1). The structures that meet these screening requirements are identified in this section. These identified structures require an aging management review for license renewal. The structures that are within scope are described in Sections 2.4.A and 2.4.B for NMP1 and NMP2, respectively. Additionally, structural commodities are described in Section 2.4.C. These commodities apply to both NMP1 and NMP2.

2.4.A NMP1 STRUCTURES

The following structures are included in this subsection.

- NMP1 Primary Containment Structure (Section 2.4.A.1)
- NMP1 Reactor Building (Section 2.4.A.2)
- NMP1 Essential Yard Structures (Section 2.4.A.3)
- NMP1 Fuel Handling System (Section 2.4.A.4)
- NMP1 Material Handling System (Section 2.4.A.5)
- NMP1 Offgas Building (Section 2.4.A.6)
- NMP1 Personnel/Equipment Access System (Section 2.4.A.7)
- NMP1 Radwaste Solidification and Storage Building (Section 2.4.A.8)
- NMP1 Screen and Pump House Building (Section 2.4.A.9)
- NMP1 Turbine Building (Section 2.4.A.10)
- NMP1 Vent Stack (Section 2.4.A.11)

- NMP1 Waste Disposal Building (Section 2.4.A.12)

2.4.A.1 NMP1 PRIMARY CONTAINMENT STRUCTURE

Description

The NMP1 Primary Containment Structure (PCS) is a seismic Class I structure. The primary containment is a Mark I design that consists of a drywell, a suppression chamber in the shape of a torus, and a connecting vent system between the drywell and the suppression chamber. It also includes valves and piping associated with the vacuum breaker system and the structural portions of primary containment penetrations. The drywell is a steel pressure vessel in the shape of an inverted light bulb. The drywell is enclosed in reinforced concrete for shielding purposes. The stiffened pressure suppression chamber is a steel pressure vessel in the shape of a torus located below and encircling the drywell. The PCS is part of a multibarrier system with a primary barrier consisting of the primary containment with its pressure suppression system and a secondary barrier consisting of the Reactor Building (RB) (Section 2.4.A.2). The PCS contains the released steam in the event of the design basis LOCA to limit the release to the RB of fission products associated with this accident. The PCS is an enclosure for the RPV, the Reactor Recirculation system, and other branch connections of the reactor coolant pressure boundary.

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The entire PCS is made up of components that require an AMR.

USAR Reference(s)

More information about the PCS can be found in USAR Sections VI.A and VI.B.

License Renewal Drawings

- LR-18006-C, Sheet 2, Revision 0, Drywell and Torus Isolation and Block Valves

- LR-45136-C, Sheet 8, Revision 0, Instrumentation Valve Schedule

Components Subject to an AMR

The component types requiring an AMR for the PCS and their intended functions are shown in Table 2.4.A.1-1. The AMR results for these component types are provided in Table 3.5.2.A-1.

Table 2.4.A.1-1
NMP1 Primary Containment Structure

Component Type	Intended Functions
Airlocks	Pressure Boundary
Concrete in Air	Structural/Functional Support Structural Support for NSR
Equipment Hatches (including stabilizers)	Pressure Boundary
Expansion Joints (Mechanical)	Pressure Boundary
Expansion/Grouted Anchors (Carbon and Low Alloy Steel) in Air	Structural/Functional Support
Fasteners (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	Structural/Functional Support
Fasteners (High Strength Carbon and Low Alloy Steel) in Demineralized Untreated Water, Low Flow	Structural/Functional Support
Piping (Mechanical)	Pressure Boundary
Polymer in Air	Pressure Boundary Shelter/Protection
Structural Steel (Carbon and Low Alloy Steel) in Air	Missile Barrier Pressure Boundary Shelter/Protection Structural/Functional Support Structural Support for NSR
Structural Steel (Carbon and Low Alloy Steel) in Demineralized Untreated Water, Low Flow	Fission Product Barrier Pressure Boundary Structural/Functional Support
Structural Steel (Wrought Austenitic Stainless Steel) in Air	Pressure Boundary Structural/Functional Support
Structural Steel (Wrought Austenitic Stainless Steel) in Demineralized Untreated Water, Low Flow	Structural/Functional Support
Valves (Mechanical)	Pressure Boundary

2.4.A.2 NMP1 REACTOR BUILDING

Description

The NMP1 RB is a seismic Class I structure which encloses the PCS pressure suppression system. The RB is a multi-floored structure, comprising a substantial reinforced concrete substructure with reinforced concrete walls extending up to the operating floor level and a steel framed superstructure above the operating floor level. The rectangular RB structure is bounded on its south and east faces by the Turbine Building (TB) auxiliary equipment area and auxiliary extension building, respectively. Airlocks are provided on the areas of the building where access doors are provided. The reinforced concrete building substructure is founded on bedrock. Precast concrete panels and uninsulated metal wall panels are applied to the exterior of the reinforced concrete walls of the reactor building, except around the airlocks. However, these panels do not form a part of the building support. Metal wall panels and roofing above the operating floor are leak tight.

This structure provides secondary containment when the pressure suppression system is in service, and primary containment during refueling, maintenance, or testing, when the PCS is open or not required. The major safety function of the secondary containment is to minimize ground-level release of airborne radioactive materials by providing controlled, elevated release of the building atmosphere through a filter system under accident conditions.

The RB houses the refueling and reactor servicing equipment, fresh and spent fuel storage facilities, and other reactor auxiliary or service equipment.

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

The entire RB is made up of components that require an AMR.

USAR Reference(s)

More information about the RB can be found in USAR Section VI.C.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the RB and their intended functions are shown in Table 2.4.A.2-1. The AMR results for these component types are provided in Table 3.5.2.A-2.

Table 2.4.A.2-1
NMP1 Reactor Building

Component Type	Intended Functions
Aluminum Alloys in Air	Flood Protection
Aluminum Alloys in Treated Water	Flood Protection Structural Support for NSR
Block Wall in Air	Fire Barrier Pressure Boundary
Boraflex in Treated Water	Absorbs Neutrons
Boral in Treated Water	Absorbs Neutrons
Concrete in Air	Fire Barrier Shelter/Protection Structural Support for NSR Structural/Functional Support
Concrete in Soil Above the Ground Water Table (GWT)	Shelter/Protection Structural Support for NSR Structural/Functional Support
Concrete in Soil Below the GWT	Shelter/Protection Structural Support for NSR Structural/Functional Support
Doors	Fire Barrier
	Fire Barrier Pressure Boundary
	Pressure Boundary
	Pressure Boundary Shelter/Protection
Expansion/Grouted Anchors (Carbon and Low Alloy Steel) in Air	Structural/Functional Support
Fasteners (Carbon and Low Alloy Steel) in Air	Structural/Functional Support
Fasteners (Wrought Austenitic Stainless Steel) in Air	Structural/Functional Support
Fasteners (Wrought Austenitic Stainless Steel) in Treated Water	Structural/Functional Support
Siding in Air	Pressure Boundary
Polymer in Air	Pressure Boundary Shelter/Protection
Polymer in Treated Water	Pressure Boundary
Rock Anchors (Carbon and Low Alloy Steel) in Soil Below the GWT	Structural/Functional Support

Table 2.4.A.2-1
NMP1 Reactor Building (cont'd)

Component Type	Intended Functions
Structural Steel (Carbon and Low Alloy Steel) in Air	Fire Barrier Fission Product Barrier Missile Barrier Pressure Boundary Shelter/Protection Structural/Functional Support Thermal Shielding
Structural Steel (Wrought Austenitic Stainless Steel) in Treated Water	Pressure Boundary
Torus Support Columns	Structural/Functional Support

2.4.A.3 NMP1 ESSENTIAL YARD STRUCTURES

Description

The NMP1 Essential Yard Structures (EYS) include the seismic Class I and Class II essential yard buildings, plus structures and civil foundation supports for safety related electrical or mechanical equipment items located within the Yard. The Yard is defined as the owner controlled outside areas surrounding the major NMP1 plant buildings, both inside and outside the NMPNS protected area. The earthen structures, which provide flood protection to the site, are included in the NMP2 EYS (Section 2.4.B.6). Included in the EYS are the Administration Building Extension and the Radwaste Pipe Tunnel Extension. The Administration Building Extension is a Class II Structure and is seismically designed due to its proximity to the NMP1 Diesel Generator Rooms. Also included are safety-related tank foundations. There are no class 1E ductlines or manholes in the yard at NMP1. The EYS also include the structures that support the equipment and high voltage lines in the 115KV switchyard for Station Blackout (SBO). The SBO components are addressed in the 115KV AC Electrical Distribution System (Section 2.5.A.6).

These structures are in scope for license renewal for the following reasons:

- They perform a safety-related function per 10 CFR 54.4(a)(1).
- They contain NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- They contains SCs 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), and station blackout (10 CFR 50.63).

The components subject to an AMR include concrete, structural steel, polymers, and fasteners in the Administration Building Extension; concrete above and below grade in the Radwaste Pipe Tunnel Extension, Emergency Diesel Fuel Oil Storage Tank foundations, and Administration Building Extension foundations; the concrete pad for the Nitrogen Storage Tank, and structures that support SBO components.

USAR Reference(s)

More information about the Administration Building Extension can be found in USAR Section III.E.1.1. More information about the Radwaste Pipe Tunnel can be found in USAR Section III.I.3.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the EYS and their intended functions are shown in Table 2.4.A.3-1. The AMR results for these component types are provided in Table 3.5.2.A-3.

Table 2.4.A.3-1
NMP1 Essential Yard Structures

Component Type	Intended Functions
Concrete in Air	Fire Barrier Structural/Functional Support Structural Support for NSR
Concrete in Soil Above the GWT	Structural/Functional Support Structural Support for NSR
Concrete in Soil Below the GWT	Structural Support for NSR
Fasteners (Carbon and Low Alloy Steel) in Air	Structural Support for NSR
Polymer in Air, Relative Motion (Bearing Plate)	Structural Support for NSR
Structural Steel (Carbon and Low Alloy Steel) in Air	Shelter/Protection Structural Support for NSR

2.4.A.4 NMP1 FUEL HANDLING SYSTEM

Description

The NMP1 Fuel Handling System involves those components used to move fuel from the time of receipt of new fuel to the storage of spent fuel in the spent fuel storage pool. Components that are evaluated in the Fuel Handling System include the refueling transfer canal, the refueling platform, and spent fuel racks. Although the reactor building crane handles fuel, it is analyzed in the Material Handling System (Section 2.4.A.5).

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The only components subject to an AMR for the Fuel Handling System are the spent fuel pool storage racks, including the structural steel and fasteners.

USAR Reference(s)

More information about the Fuel Handling System can be found in USAR Section X.J.

License Renewal Drawings

None

Components Subject to an AMR

The component types requiring an AMR for the Fuel Handling System and their intended functions are shown in Table 2.4.A.4-1. The AMR results for these component types are provided in Table 3.5.2.A-4.

Table 2.4.A.4-1
NMP1 Fuel Handling System

Component Type	Intended Functions
Fasteners (Wrought Austenitic Stainless Steel) in Treated Water	Structural/Functional Support
Spent Fuel Racks	Structural/Functional Support
Structural Steel (Wrought Austenitic Stainless Steel) in Treated Water	Structural/Functional Support Structural Support for NSR

2.4.A.5 NMP1 MATERIAL HANDLING SYSTEM

Description

The NMP1 Material Handling System consists of overhead traveling cranes, monorail hoists, platform cranes, jib cranes, and associated mechanical and electrical components. For license renewal purposes, the crane girders and rails are included in the structural steel asset of the structure in which the crane is located.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The only components that require an AMR are the Screenhouse gate hoists and the 125-ton capacity RB crane.

USAR Reference(s)

More information about the Material Handling System can be found in USAR Section X.J.

License Renewal Drawings

None

Components Subject to an AMR

The component types requiring an AMR for the Material Handling System and their intended functions are shown in Table 2.4.A.5-1. The AMR results for these component types are provided in Table 3.5.2.A-5.

Table 2.4.A.5-1
NMP1 Material Handling System

Component Type	Intended Functions
Crane (Reactor Building)	Structural/Functional Support Structural Support for NSR
Hoists	Structural/Functional Support

2.4.A.6 NMP1 OFFGAS BUILDING

Description

The NMP1 Offgas Building (OGB) is a seismic Class I structure. The OGB is located adjacent to the Turbine Building (Section 2.4.A.10) and the Waste Disposal Building (Section 2.4.A.12). The OGB substructure is a reinforced concrete structure and is founded on bedrock. The superstructure is structural steel frame with exterior metal walls and masonry block. The interior walls of the substructure are reinforced concrete and concrete block. The OGB contains the piping and equipment associated with the Condenser Air Removal and Offgas System (Section 2.3.4.A.2).

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

The entire OGB is made up of components that require an AMR.

USAR Reference(s)

More information about the OGB can be found in USAR Section III.D.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the OGB and their intended functions are shown in Table 2.4.A.6-1. The AMR results for these component types are provided in Table 3.5.2.A-6.

Table 2.4.A.6-1
NMP1 Offgas Building

Component Type	Intended Functions
Block Wall in Air	Fire Barrier
Concrete in Air	Fire Barrier Structural/Functional Support Structural Support for NSR
Concrete in Soil Above the GWT	Structural/Functional Support
Concrete in Soil Below the GWT	Structural/Functional Support
Concrete Lean Fill in Soil Below the GWT	Structural Support for NSR
Doors	Fire Barrier
Expansion/Grouted Anchors (Carbon and Low Alloy Steel) in Air	Structural Support for NSR
Fasteners (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Fasteners (Wrought Austenitic Stainless Steel) in Air	Structural Support for NSR
Structural Steel (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR

2.4.A.7 NMP1 PERSONNEL/EQUIPMENT ACCESS SYSTEM

Description

The NMP1 Personnel/Equipment Access System consists of doors, gates, and the electronic equipment that monitors their positions. The gates and electronic equipment are not in scope for license renewal.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

USAR Reference(s)

None

License Renewal Drawings

None

Components Subject to an AMR

All doors have been transferred to, and are addressed in, the appropriate structures where the doors are physically located. There are no other components subject to an AMR for this system.

2.4.A.8 NMP1 RADWASTE SOLIDIFICATION AND STORAGE BUILDING

Description

The NMP1 Radwaste Solidification and Storage Building (RSSB) is a seismic Class I structure located to the east of, and directly adjacent to, the OGB Section 2.4.A.6) and the Waste Disposal Building (Section 2.4.A.12). The RSSB is a reinforced concrete structure. The foundation mat is founded on bedrock. During normal operation, maintenance, and loading and unloading operations, the structure provides sufficient environmental isolation.

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

The entire RSSB is made up of components that require an AMR.

USAR Reference(s)

More information about the RSSB can be found in USAR Section III.I.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the RSSB and their intended functions are shown in Table 2.4.A.8-1. The AMR results for these component types are provided in Table 3.5.2.A-7.

Table 2.4.A.8-1
NMP1 Radwaste Solidification and Storage Building

Component Type	Intended Functions
Block Wall in Air	Fire Barrier Thermal Shielding
Concrete in Air	Direct Flow Fire Barrier Flood Protection Structural Support for NSR Thermal Shielding
Concrete in Soil Above the GWT	Flood Protection Structural Support for NSR
Concrete in Soil Below the GWT	Flood Protection Structural Support for NSR
Doors	Fire Barrier
Fasteners (Carbon and Low Alloy Steel) in Air	Structural Support for NSR
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	Structural Support for NSR
Polymer in Air	Gaseous Discharge Path
Structural Steel (Carbon and Low Alloy Steel) in Air	Flood Protection Pressure Boundary Structural Support for NSR

2.4.A.9 NMP1 SCREEN AND PUMP HOUSE BUILDING

Description

The NMP1 Screen and Pump House (SPH) Building is a seismic Class I and Class II structure which is adjacent to the north wall of the RB and TB. The Class II superstructure is framed structural steel supported on a Class I reinforced concrete substructure that is founded on bedrock. The exterior wall is internally-insulated precast concrete panels. The SPH Building comprises channels for the flow of very large quantities of raw lake water, gates, stop logs for control of the flow, racks, screens for cleaning the water, and pumps.

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

The entire SPH Building is made up of components that require an AMR.

USAR Reference(s)

More information about the SPH Building can be found in USAR Section III.F.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the SPH Building and their intended functions are shown in Table 2.4.A.9-1. The AMR results for these component types are provided in Table 3.5.2.A-8.

Table 2.4.A.9-1
NMP1 Screen and Pump House Building

Component Type	Intended Functions
Block Wall in Air	Fire Barrier
Concrete in Air	Fire Barrier Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete in Raw Water	Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete in Soil Above the GWT	Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete in Soil Below the GWT	Shelter/Protection Structural/Functional Support Structural Support for NSR
Doors	Fire Barrier
Expansion/Grouted Anchors (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Fasteners (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Fasteners (Carbon and Low Alloy Steel) in Raw Water	Structural Support for NSR
Structural Steel (Carbon and Low Alloy Steel) in Air	Fire Barrier Shelter/Protection Structural/Functional Support Structural Support for NSR
Structural Steel (Carbon and Low Alloy Steel) in Raw Water	Structural Support for NSR
Structural Steel (Carbon and Low Alloy Steel) in Soil Above the GWT	Structural/Functional Support
Structural Steel (Carbon and Low Alloy Steel) in Soil Below the GWT	Structural/Functional Support

2.4.A.10 NMP1 TURBINE BUILDING

Description

The NMP1 Turbine Building (TB) is a Class II structure with integrated seismic Class I areas. The reinforced concrete turbine generator foundation pedestal is isolated from the floors of the building to minimize transmission of vibration to the floors. The reinforced concrete TB foundations are supported by concrete column piers founded on bedrock 15 to 25 feet below grade. The TB superstructure consists of an enclosed structural steel frame. The roof is covered with metal decking, insulation, and tar roofing material. Located within the TB are the Generating Area, the Auxiliary Equipment Area, the Feedwater Heater Area, the Auxiliary Extension Building, and the Control Room.

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

The entire TB is made up of components that require an AMR.

USAR Reference(s)

More information about the TB can be found in USAR Sections III.A and III.B.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the TB and their intended functions are shown in Table 2.4.A.10-1. The AMR results for these component types are provided in Table 3.5.2.A-9.

Table 2.4.A.10-1
NMP1 Turbine Building

Component Type	Intended Functions
Block Wall in Air	Fire Barrier Radiation Shielding
Concrete in Air	Fire Barrier Radiation Shielding Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete in Soil Above the GWT	Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete in Soil Below the GWT	Shelter/Protection Structural/Functional Support Structural Support for NSR
Doors	Fire Barrier
	Fire Barrier Structural Support for NSR
	Shelter/Protection
	Structural Support for NSR
Expansion/Grouted Anchors (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Fasteners (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Structural Steel (Carbon and Low Alloy Steel) in Air	Shelter/Protection Structural/Functional Support Structural Support for NSR

2.4.A.11 NMP1 VENT STACK

Description

The NMP1 Vent Stack is a seismic Class I reinforced-concrete chimney, 350-ft high, located 100 ft east of the northeast corner of the RB. The height of the stack and the velocity of discharge provide a high degree of dilution for station effluents. The Vent Stack's foundation is on a massive reinforced concrete base, which extends to bedrock. From this base, it rises through the Turbine Auxiliary Building Extension from which it is completely isolated structurally.

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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).

The components that require an AMR include the concrete portion of the Vent Stack that is in air and below grade, and the structural steel exposed portions of the embedded frame around the Vent Stack.

USAR Reference(s)

More information about the Vent Stack can be found in USAR Sections III.G and XII.A.2.1.4.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the Vent Stack and their intended functions are shown in Table 2.4.A.11-1. The AMR results for these component types are provided in Table 3.5.2.A-10.

Table 2.4.A.11-1
NMP1 Vent Stack

Component Type	Intended Functions
Concrete in Air	Fire Barrier Gaseous Discharge Path Structural/Functional Support
Concrete in Soil Below the GWT	Gaseous Discharge Path Structural/Functional Support
Structural Steel (Carbon and Low Alloy Steel) in Air	Structural/Functional Support

2.4.A.12 NMP1 WASTE DISPOSAL BUILDING

Description

The NMP1 Waste Disposal Building (WDB) and WDB Extension are seismic Class I structures located between and adjacent to the RSSB and the Turbine Auxiliary Extension Building. The WDB and Extension consist of reinforced concrete substructures with steel framed superstructures from grade to their respective roof elevations. The interior walls of the substructure are reinforced concrete. The superstructure walls are also reinforced concrete or concrete masonry units. The reinforced concrete building substructure is founded on bedrock.

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

The entire WDB is made up of components that require an AMR.

USAR Reference(s)

More information about the WDB can be found in USAR Section III.C.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the WDB and their intended functions are shown in Table 2.4.A.12-1. The AMR results for these component types are provided in Table 3.5.2.A-11.

Table 2.4.A.12-1
NMP1 Waste Disposal Building

Component Type	Intended Functions
Block Wall in Air	Fire Barrier
Concrete in Air	Direct Flow Fire Barrier Flood Protection Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete in Soil Above the GWT	Flood Protection Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete in Soil Below the GWT	Flood Protection Shelter/Protection Structural/Functional Support Structural Support for NSR
Doors	Fire Barrier
Expansion/Grouted Anchors (Carbon and Low Alloy Steel) in Air	Structural Support for NSR
Fasteners (Carbon and Low Alloy Steel) in Air	Structural Support for NSR
Fasteners (Wrought Austenitic Stainless Steel) in Air	Structural Support for NSR
Polymer in Air	Flood Protection
Structural Steel (Carbon and Low Alloy Steel) in Air	Fire Barrier Flood Protection Shelter/Protection Structural Support for NSR
Structural Steel (Wrought Austenitic Stainless Steel) in Air	Structural Support for NSR

2.4.B NMP2 STRUCTURES

The following structures are included in this subsection.

- NMP2 Primary Containment Structure (Section 2.4.B.1)
- NMP2 Reactor Building (Section 2.4.B.2)
- NMP2 Auxiliary Service Building (Section 2.4.B.3)
- NMP2 Control Room Building (Section 2.4.B.4)
- NMP2 Diesel Generator Building (Section 2.4.B.5)
- NMP2 Essential Yard Structures (Section 2.4.B.6)
- NMP2 Fuel Handling System (Section 2.4.B.7)
- NMP2 Main Stack (Section 2.4.B.8)
- NMP2 Material Handling System (Section 2.4.B.9)
- NMP2 Motor Operated Doors System (Section 2.4.B.10)
- NMP2 Radwaste Building (Section 2.4.B.11)
- NMP2 Screenwell Building (Section 2.4.B.12)
- NMP2 Standby Gas Treatment Building (Section 2.4.B.13)
- NMP2 Turbine Building (Section 2.4.B.14)

2.4.B.1 NMP2 PRIMARY CONTAINMENT STRUCTURE

Description

The NMP2 Primary Containment Structure (PCS) is a seismic Category I structure consisting of a drywell chamber, located above a suppression chamber, and a drywell floor, which separates the drywell chamber from the suppression chamber. It also includes the structural portions of primary containment penetrations. The PCS is supported on a 10-ft thick reinforced concrete mat, which also supports the RB. A series of 24-in diameter downcomer vent pipes penetrates the drywell floor. The drywell is a steel-lined reinforced concrete vessel in the shape of a frustum of two cones, closed by a dome with a torispherical head. The PCS contains a Mark II pressure suppression system. The pressure suppression chamber is a cylindrical stainless steel clad steel-lined reinforced concrete vessel located below the drywell. The PCS houses the RPV, the Reactor Recirculation System, and other branch connections of the reactor coolant pressure boundary. The function of the PCS is to restrict the release of radioactivity.

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The entire PCS is made up of components that require an AMR.

USAR Reference(s)

More information about the PCS can be found in USAR Sections 3.8.1 and 3.8.3.

License Renewal Drawings

None

Components Subject to an AMR

The component types requiring an AMR for the PCS and their intended functions are shown in Table 2.4.B.1-1. The AMR results for these component types are provided in Table 3.5.2.B-1.

Table 2.4.B.1-1
NMP2 Primary Containment Structure

Component Type	Intended Functions
Air Locks	Fission Product Barrier Missile Barrier Pressure Boundary Radiation Shielding Shelter/Protection
Aluminum Alloy in Air	Pipe Whip Restraint
Biological Shield Wall Doors	HELB Shielding Radiation Shielding
Concrete in Air	HELB Shielding Missile Barrier Pressure Boundary Radiation Shielding Shelter/Protection Structural/Functional Support
Drywell Head (including stainless steel elements)	Fission Product Barrier Missile Barrier Pressure Boundary Shelter/Protection
Drywell Head Closure Pins	Fission Product Barrier Pressure Boundary Structural/Functional Support
Drywell Head Fasteners	Structural Support for NSR
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	Pipe Whip Restraint Structural/Functional Support
Fasteners (Precipitation Hardenable)	Pipe Whip Restraint
Hatches	Fission Product Barrier Missile Barrier Pressure Boundary Radiation Shielding Shelter/Protection
Impingement and Jet Shielding	Direct Flow HELB Shielding
Inner Refueling Seal	Structural Support for NSR
Polymer in Air	Direct Flow Pressure Boundary
Refueling Bulkhead	Pressure Boundary Structural/Functional Support
Star Truss	Structural/Functional Support

Table 2.4.B.1-1
NMP2 Primary Containment Structure (cont'd)

Component Type	Intended Functions
Structural Steel (Carbon and Low Alloy Steel) in Air	HELB Shielding Missile Barrier Pipe Whip Restraint Pressure Boundary Radiation Shielding Shelter/Protection Structural/Functional Support
Structural Steel (Carbon/Low Alloy Steel Clad with Stainless Steel) in Air	HELB Shielding Missile Barrier Pressure Boundary Shelter/Protection Structural/Functional Support
Structural Steel (Carbon/Low Alloy Clad with Stainless Steel) in Demineralized Untreated Water	HELB Shielding Missile Barrier Pressure Boundary Shelter/Protection Structural/Functional Support
Structural Steel (Wrought Austenitic Stainless Steel) in Air	Direct Flow HELB Shielding Missile Barrier Pipe Whip Restraint Pressure Boundary Shelter/Protection Structural/Functional Support
Structural Steel (Wrought Austenitic Stainless Steel) in Demineralized Untreated Water	Direct Flow HELB Shielding Missile Barrier Pressure Boundary Shelter/Protection Structural/Functional Support

2.4.B.2 NMP2 REACTOR BUILDING

Description

The NMP2 Reactor Building (RB) is a seismic Category I structure that encloses the PCS. The RB wall is a reinforced concrete cylinder with varying wall thickness, extending from the top of the mat to the polar crane level. The wall from the crane rail elevation to the roof is steel framing with insulated metal siding. The metal siding panels have sealed joints to minimize air leakage.

The RB, including the auxiliary bays, is founded on a rock-bearing, reinforced concrete mat. The mat acts to support the RB, auxiliary bays, and the primary containment. The auxiliary bays are rigidly attached to the RB and considered part of the secondary containment structure.

The RB houses the refueling and reactor servicing equipment, new and spent fuel storage facilities, and other reactor auxiliary or service equipment, including the RCIC System, Reactor Water Cleanup System, Standby Liquid Control System, CRD System equipment, core standby cooling systems, RHR systems, and electrical equipment components. Included within the RB for the purposes of license renewal are the secondary containment, the north and south auxiliary bays, and the main steam tunnel east of the turbine building. The primary purposes for the secondary containment are to minimize ground level release of airborne radioactive materials and to provide means for a controlled elevated release of the building atmosphere. Civil/structural components from the Fuel Nuclear Transfer System and the Vents –Turbine and Reactor Building System are also evaluated as part of the RB.

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

The entire RB is made up of components that require an AMR.

USAR Reference(s)

More information about the RB can be found in USAR Section 3.8.4.1.1.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the RB and their intended functions are shown in Table 2.4.B.2-1. The AMR results for these component types are provided in Table 3.5.2.B-2.

Table 2.4.B.2-1
NMP2 Reactor Building

Component Type	Intended Functions
Aluminum Alloy in Air	Shelter/Protection
Boraflex in Treated Water	Absorbs Neutrons
Boral in Treated Water	Absorbs Neutrons
Concrete in Air (includes removable floor/wall)	Direct Flow Fire Barrier Flood Protection HELB Shielding Missile Barrier Pressure Boundary Radiation Shielding Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete in Soil Above the GWT	Flood Protection Pressure Boundary Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete in Soil Below the GWT	Flood Protection Pressure Boundary Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete Lean Fill in Soil Below the GWT	Structural/Functional Support
Doors	Fire Barrier
	Fire Barrier Flood Protection Shelter/Protection
	Fire Barrier Pressure Boundary Shelter/Protection
	Fire Barrier Shelter/Protection
	Flood Protection Shelter/Protection
	Pressure Boundary Shelter/Protection
	Radiation Shielding Shelter/Protection
	Radiation Shielding Structural Support for NSR

Table 2.4.B.2-1
NMP2 Reactor Building (cont'd)

Component Type	Intended Functions
Doors (cont'd)	Shelter/Protection
	Structural Support for NSR
Expansion/Grouted Anchors (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Fasteners (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	Structural/Functional Support
Fasteners (Precipitation Hardenable) in Air	Pipe Whip Restraint Shelter/Protection Structural/Functional Support
Fasteners (Wrought Austenitic Stainless Steel) in Air	Structural/Functional Support
Fasteners (Wrought Austenitic Stainless Steel) in Soil Below the GWT	Flood Protection
Fasteners (Wrought Austenitic Stainless Steel) in Treated Water	Structural/Functional Support
Fuel Pool Gates	Structural/Functional Support
Fuel Transfer Shielding Bridge (Refueling Area)	Structural Support for NSR
Liners	Pressure Boundary
Mechanical Penetrations (thimbles)	Flood Protection
Metal Siding in Air	Shelter/Protection
Plug Liners	Pressure Boundary
Polymer in Air	Pressure Boundary Shelter/Protection Structural Support for NSR
Polymer in Soil Below the GWT	Flood Protection
Porous Concrete in Soil Below the GWT	Structural/Functional Support
Structural Steel (Carbon and Low Alloy Steel) in Air	Pipe Whip Restraint Pressure Boundary Shelter/Protection Structural/Functional Support Structural Support for NSR
Structural Steel (Wrought Austenitic Stainless Steel) in Air	Shelter/Protection Structural/Functional Support Structural Support for NSR
Overpressurization Vent Panels	Structural/Functional Support

2.4.B.3 NMP2 AUXILIARY SERVICE BUILDING

Description

The NMP2 Auxiliary Service Building (ASB) is a reinforced concrete and steel-framed structure. The ASB is surrounded by the RB (Section 2.4.B.2), Turbine Building (Section 2.4.B.14), and Control Room Building (Section 2.4.B.4). The ASB below elevation 261 ft is classified as seismic Category I. The basement floor is a reinforced concrete slab poured over electrical tunnels. The floor at elevation 261 ft is a concrete slab on steel deck supported by structural steel. The ASB contains the heating, ventilating and air conditioning room, instrument calibration facility, and decontamination and shower facilities for personnel.

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

The entire ASB is made up of components that require an AMR.

USAR Reference(s)

More information about the ASB can be found in USAR Section 3.8.4.1.10.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the ASB and their intended functions are shown in Table 2.4.B.3-1. The AMR results for these component types are provided in Table 3.5.2.B-3.

Table 2.4.B.3-1
NMP2 Auxiliary Service Building

Component Type	Intended Functions
Concrete in Air (includes removable floor/wall)	Fire Barrier Flood Protection Missile Barrier Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete in Soil Above the GWT	Flood Protection Shelter/Protection Structural/Functional Support
Concrete in Soil Below the GWT	Flood Protection Shelter/Protection Structural/Functional Support
Doors	Fire Barrier
Fasteners (Carbon and Low Alloy Steel) in Air	Shelter/Protection Structural/Functional Support Structural Support for NSR
Structural Steel (Carbon and Low Alloy Steel) in Air	Shelter/Protection Structural/Functional Support Structural Support for NSR

2.4.B.4 NMP2 CONTROL ROOM BUILDING

Description

The NMP2 Control Room Building (CRB) is a seismic Category I structure. It is a five-story reinforced concrete and steel structure. The exterior walls and roof are constructed of reinforced concrete. The interior floors are concrete decking supported by steel framing. The building is founded on bedrock and is supported by a reinforced concrete mat. The upper four floors are reinforced concrete slabs on steel deck supported by structural steel. Underground concrete tunnels connect the CRB to the RB. The CRB contains the control room, safety-related switchgear, batteries, and associated equipment.

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

The entire CRB is made up of components that require an AMR.

USAR Reference(s)

More information about the CRB can be found in USAR Section 3.8.4.1.2.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the CRB and their intended functions are shown in Table 2.4.B.4-1. The AMR results for these component types are provided in Table 3.5.2.B-4.

Table 2.4.B.4-1
NMP2 Control Room Building

Component Type	Intended Functions
Concrete in Air (includes removable floor/wall)	Fire Barrier Flood Protection Missile Barrier Pressure Boundary Radiation Shielding Shelter/Protection Structural/Functional Support
Concrete in Soil Above the GWT	Flood Protection Structural/Functional Support
Concrete in Soil Below the GWT	Flood Protection Structural/Functional Support
Concrete Lean Fill in Soil Below the GWT	Structural/Functional Support
Doors	Fire Barrier
	Fire Barrier Flood Protection Shelter/Protection
	Fire Barrier Pressure Boundary Shelter/Protection
	Fire Barrier Shelter/Protection
	Missile Barrier Shelter/Protection
	Shelter/Protection
	Structural Support for NSR
Expansion/Grouted Anchors (Carbon and Low Alloy Steel) in Air	Structural/Functional Support
Fasteners (Carbon and Low Alloy Steel) in Air	Shelter/Protection Structural/Functional Support
Structural Steel (Carbon and Low Alloy Steel) in Air	Shelter/Protection Structural/Functional Support Structural Support for NSR

2.4.B.5 NMP2 DIESEL GENERATOR BUILDING

Description

The NMP2 Diesel Generator Building (DGB) is a seismic Category I reinforced concrete structure enclosing the three DGs and their associated equipment. The DGs are supported on reinforced concrete pedestals. The building is divided into three rooms separated by fire walls, each housing one DG. Fuel oil storage tanks are located below the building, with their fuel oil pumps housed in the individual DG rooms. The DGB is founded on bedrock and supported by reinforced concrete wall footings.

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

The entire DGB is made up of components that require an AMR.

USAR Reference(s)

More information about the DGB can be found in USAR Section 3.8.4.1.3.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the DGB and their intended functions are shown in Table 2.4.B.5-1. The AMR results for these component types are provided in Table 3.5.2.B-5.

Table 2.4.B.5-1
NMP2 Diesel Generator Building

Component Type	Intended Functions
Concrete in Air	Fire Barrier Flood Protection Missile Barrier Shelter/Protection Structural/Functional Support
Concrete in Soil Above the GWT	Flood Protection Shelter/Protection Structural/Functional Support
Concrete in Soil Below the GWT	Flood Protection Shelter/Protection Structural/Functional Support
Concrete Lean Fill in Air	Structural/Functional Support
Concrete Lean Fill in Soil Above GWT	Structural/Functional Support
Concrete Lean Fill in Soil Below GWT	Structural/Functional Support
Doors	Fire Barrier
	Fire Barrier Shelter/Protection
	Shelter/Protection
	Structural Support for NSR
Expansion/Grouted Anchors (Carbon and Low Alloy Steel) in Air	Structural/Functional Support
Fasteners (Carbon and Low Alloy Steel) in Air	Structural/Functional Support
Polymer in Air	Flood Protection
Structural Steel (Carbon and Low Alloy Steel) in Air	Missile Barrier Shelter/Protection Structural/Functional Support

2.4.B.6 NMP2 ESSENTIAL YARD STRUCTURES

Description

The NMP2 Essential Yard Structures (EYS) include, but are not limited to, electrical, piping, and vent tunnels; manholes; underground duct banks; and earth berms and ditches used for flood control. Seismic Category I electrical tunnels and piping tunnels contain Category I systems and are constructed of reinforced concrete. Included in the essential yard structures are all Class 1E duct banks and manholes. Earthen berms are located around the perimeter of the site to provide flood protection to the site. A stone-faced dike was constructed along the shoreline. The dike prevents flooding of the plant from high lake water levels and the effects of the probable maximum windstorm. The EYS also include the structures that support the equipment and high voltage lines in the 115KV switchyard and Scriba substation for SBO. The SBO components are evaluated in the NMP2 Switchyard System (Section 2.5.B.29).

These structures are in scope for license renewal for the following reasons:

- They perform safety-related functions per 10 CFR 54.4(a)(1).
- They contain NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- They contain SCs 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) and station blackout (10 CFR 50.63).

The components subject to an AMR include earthen berms, the stone-faced dike, concrete portions of the tunnels and the revetment ditch, penetrations through the piping tunnels, and structures that support SBO components.

USAR Reference(s)

More information about the Essential Yard Structures can be found in USAR Sections 2.4.2.3.3, 2.4.5.5, 2.5.1.1.5, 3.8.4.1.7, 8.3.1.3.2, and 8.3.1.4.2.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the EYS and their intended functions are shown in Table 2.4.B.6-1. The AMR results for these component types are provided in Table 3.5.2.B-6.

Table 2.4.B.6-1
NMP2 Essential Yard Structures

Component Type	Intended Functions
Aluminum Alloy in Air	Structural Support for NSR
Concrete in Air (includes removable floor/wall)	Fire Barrier Flood Protection Missile Barrier Shelter/Protection Structural Support for NSR
Concrete in Soil Above the GWT	Flood Protection Missile Barrier Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete in Soil Below the GWT	Flood Protection Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete Lean Fill in Soil Below GWT	Structural/Functional Support
Doors	Fire Barrier
	Fire Barrier Shelter/Protection
	Shelter/Protection
	Structural Support for NSR
Earthen Berm in Air	Flood Protection
Expansion/Grouted Anchors (Carbon and Low Alloy Steel) in Air	Flood Protection Structural Support for NSR
Fasteners (Carbon and Low Alloy Steel) in Air	Structural Support for NSR
Fasteners (Wrought Austenitic Stainless Steel) in Air	Flood Protection
Fasteners (Wrought Austenitic Stainless Steel) in Soil Below the GWT	Flood Protection
Gray Cast Iron in Air	Shelter/Protection

Table 2.4.B.6-1
NMP2 Essential Yard Structures (cont'd)

Component Type	Intended Functions
Gray Cast Iron in Soil Above the GWT	Shelter/Protection
Mechanical Penetrations (thimbles)	Flood Protection
Polymer in Air	Flood Protection
Polymer in Soil Below the GWT	Flood Protection
Revetment Ditch in Air	Flood Protection
Stone-Faced Dike in Air	Flood Protection
Structural Steel (Carbon and Low Alloy Steel) in Air	Structural Support for NSR
Treated Wood in Air	Structural Support for NSR
Treated Wood in Soil Above the GWT	Structural Support for NSR
Treated Wood in Soil Below the GWT	Structural Support for NSR

2.4.B.7 NMP2 FUEL HANDLING SYSTEM

Description

The NMP2 Fuel Handling System involves those components used to move fuel from the time of receipt of new fuel to the storage of spent fuel in the spent fuel storage pool. Components that are evaluated in the Fuel Handling System include the fuel transfer shielding bridge, the refueling crane platform and equipment, the new fuel storage vault, lifting and handling equipment, and spent fuel pool storage racks. Although the reactor building polar crane handles fuel, it is analyzed in the Material Handling System (Section 2.4.B.9). Civil/structural components from the Fuel Nuclear Refueling; Fuel Nuclear Storage; and Materials Handling Fuel Storage Area subsystems are also evaluated as part of the Fuel Handling System.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components subject to an AMR for the Fuel Handling System include the spent fuel pool storage racks, the refueling crane and platform equipment, the new fuel storage vault cover, new fuel storage racks, and miscellaneous lifting equipment.

USAR Reference(s)

More information about the Fuel Handling System can be found in USAR Sections 9.1.1, 9.1.2, and 9.1.4.

License Renewal Drawings

None

Components Subject to an AMR

The component types requiring an AMR for the Fuel Handling System and their intended functions are shown in Table 2.4.B.7-1. The AMR results for these component types are provided in Table 3.5.2.B-7.

Table 2.4.B.7-1
NMP2 Fuel Handling System

Component Type	Intended Functions
Carousel	Structural/Functional Support
Lifting Beams	Structural/Functional Support
New Fuel Storage Rack	Structural/Functional Support
New Fuel Storage Vault Cover	Structural Support for NSR
Recirculation Pump Motor Lifting Lugs	Structural/Functional Support
Refueling Crane and Platform Equipment	Structural/Functional Support
Storage Racks and Frames	Structural/Functional Support

2.4.B.8 NMP2 MAIN STACK

Description

The NMP2 Main Stack is a seismic Category 1 reinforced-concrete chimney, approximately 430-ft high, located on the northeast side of the power station. The Main Stack is designed and constructed to provide elevated release of offgas, standby gas treatment, turbine building ventilation, and other systems. The Main Stack foundation is a on a reinforced concrete base, which extends to bedrock.

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components that require an AMR include the entire Main Stack and miscellaneous steel and fasteners within the Main Stack.

USAR Reference(s)

More information about the Main Stack can be found in USAR Section 3.8.4.1.8.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the Main Stack and their intended functions are shown in Table 2.4.B.8-1. The AMR results for these component types are provided in Table 3.5.2.B-8.

Table 2.4.B.8-1
NMP2 Main Stack

Component Type	Intended Functions
Concrete in Air	Gaseous Discharge Path Structural/Functional Support Structural Support for NSR
Concrete in Soil Above the GWT	Structural/Functional Support
Concrete in Soil Below the GWT	Structural/Functional Support
Concrete Lean Fill in Soil Below the GWT	Structural/Functional Support
Expansion/Grouted Anchors (Carbon and Low Alloy Steel) in Air	Structural Support for NSR
Fasteners (Carbon and Low Alloy Steel) in Air	Structural Support for NSR
Structural Steel (Carbon and Low Alloy Steel) in Air	Structural Support for NSR

2.4.B.9 NMP2 MATERIAL HANDLING SYSTEM

Description

The NMP2 Material Handling System consists of overhead traveling cranes, monorail hoists, platform cranes, jib cranes, and associated mechanical and electrical components. For license renewal purposes, the crane girders and rails are included in the structural steel asset of the structure in which the crane is located.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components that require an AMR include the RB polar crane, the recirculation motor crane, the Emergency Diesel Generator crane, the safety relief valve hoists, the main steam isolation valve crane and hoists, the stop log area crane, and the screenwell area traveling crane.

USAR Reference(s)

More information about the Material Handling System can be found in USAR Appendix 9C.

License Renewal Drawings

None

Components Subject to an AMR

The component types requiring an AMR for the Material Handling System and their intended functions are shown in Table 2.4.B.9-1. The AMR results for these component types are provided in Table 3.5.2.B-9.

Table 2.4.B.9-1
NMP2 Material Handling System

Component Type	Intended Functions
Handling Cranes	Structural Support for NSR
Hoists	Structural Support for NSR
Polar Crane	Structural/Functional Support

2.4.B.10 NMP2 MOTOR OPERATED DOORS SYSTEM

Description

The NMP2 Motor Operated Doors System consists of various motor operated doors and the associated electronic equipment that monitors their positions.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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).

USAR Reference(s)

More information about the Motor Operated Doors System can be found in USAR Section 3.8.4.1.

License Renewal Drawings

None

Components Subject to an AMR

All doors have been transferred to, and are addressed in, the appropriate structures where the doors are physically located. The remaining electrical components are active components. There are no other components subject to an AMR for this system.

2.4.B.11 NMP2 RADWASTE BUILDING

Description

The NMP2 Radwaste Building (RWB) is a seismic Category I structure and contains the radioactive waste system. It is a five-story, concrete and steel building. The exterior walls are reinforced concrete. A rolling steel door is provided in the north wall for truck access into the building. The basement floor is a concrete mat on bedrock. The upper four floors are concrete supported by steel deck and beams. The roof consists of steel framing with steel deck, insulation, and four-ply, built-up roofing. The decontamination area is located south of the RWB, and is an extension of the TB and the RWB.

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

The entire RWB is made up of components that require an AMR.

USAR Reference(s)

More information about the RWB can be found in USAR Section 3.8.4.1.11.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the RWB and their intended functions are shown in Table 2.4.B.10-1. The AMR results for these component types are provided in Table 3.5.2.B-10.

Table 2.4.B.10-1
NMP2 Radwaste Building

Component Type	Intended Functions
Concrete in Air	Fire Barrier Flood Protection Radiation Shielding Structural Support for NSR
Concrete in Soil Above the GWT	Flood Protection Structural Support for NSR
Concrete in Soil Below the GWT	Flood Protection Structural Support for NSR
Concrete Lean Fill in Soil Below the GWT	Structural Support for NSR
Doors	Fire Barrier
Expansion/Grouted Anchors (Carbon and Low Alloy Steel) in Air	Structural Support for NSR
Fasteners (Carbon and Low Alloy Steel) in Air	Structural Support for NSR
Structural Steel (Carbon and Low Alloy Steel) in Air	Flood Protection Radiation Shielding Structural Support for NSR

2.4.B.12 NMP2 SCREENWELL BUILDING

Description

The NMP2 Screenwell Building (SWB) consists of a concrete substructure and a steel frame superstructure. The substructure, below grade elevation 261'-0", including the service water pump room, is designated seismic Category I, whereas the steel frame superstructure, including the circulating water pump and water treatment area, is designed as a non-Category I area. The SWB includes the service water pump rooms, the diesel and electric fire pump rooms, the water treatment area, the circulating water pump area, and other associated equipment. Stop logs, traveling screens, trash rakes, etc., are set in the concrete walls, as required to divert the flow of water. These components are built-up structures of steel and concrete guided and supported by the reinforced concrete walls and floors.

For license renewal purposes, the SWB also includes the Intake Structures and the intake/discharge tunnels. Further information on these structures is provided below.

The seismic Category I Intake Structures are hexagonal-shaped reinforced concrete structures connected to the intake/discharge tunnels. The structures rest on a concrete slab founded on bedrock at the lake bottom and are anchored to the concrete-encased steel tiedowns embedded into the rock. The continuity of waterflow into the intake tunnel is assured by means of heated bar racks, one at each face of the hexagon.

The intake/discharge tunnels extend from the screenwell shaft eastward and northward under Lake Ontario to the intake structures. These tunnels are safety-related with the exception of the nonseismic, discharge portion of Tunnel No. 1 that extends beyond the intake structure to the discharge diffusers. The discharge water flows around the concrete encasement within the tunnel and is eventually discharged into the lake via a discharge diffuser.

The SWB is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

The entire SWB is made up of components that require an AMR.

USAR Reference(s)

More information about the SWB can be found in USAR Sections 3.8.4.1.4, 3.8.4.1.5, and 3.8.4.1.6.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the SWB and their intended functions are shown in Table 2.4.B.11-1. The AMR results for these component types are provided in Table 3.5.2.B-11.

Table 2.4.B.11-1
NMP2 Screenwell Building

Component Type	Intended Functions
Block Wall in Air	Fire Barrier
Concrete in Air (includes removable floor/wall)	Fire Barrier Flood Protection Missile Barrier Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete in Raw Water	Flood Protection Missile Barrier Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete in Soil Above the GWT	Flood Protection Shelter/Protection Structural/Functional Support
Concrete in Soil Below the GWT	Flood Protection Shelter/Protection Structural/Functional Support
Concrete Lean Fill in Raw Water	Structural/Functional Support
Concrete Lean Fill in Soil Above the GWT	Structural/Functional Support
Concrete Lean Fill in Soil Below the GWT	Structural/Functional Support
Doors	Fire Barrier
Expansion/Grouted Anchors (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Fasteners (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Fasteners (Carbon and Low Alloy Steel) in Raw Water	Structural/Functional Support Structural Support for NSR
Fasteners (Wrought Austenitic Stainless Steel) in Raw Water	Structural/Functional Support
Polymer in Raw Water	Structural/Functional Support
Structural Steel (Carbon and Low Alloy Steel) in Air	Shelter/Protection Structural/Functional Support Structural Support for NSR
Structural Steel (Carbon and Low Alloy Steel) in Raw Water	Cooling Water Source Filtration Shelter/Protection
Structural Steel (Wrought Austenitic Stainless Steel) in Raw Water	Shelter/Protection Structural/Functional Support
Structural Steel Foundation Piles (Carbon and Low Alloy Steel) in Undisturbed Soil	Structural/Functional Support

2.4.B.13 NMP2 STANDBY GAS TREATMENT BUILDING

Description

The NMP2 Standby Gas Treatment Building (SGTB) and railroad access area contain the SGT filters and associated equipment and allow access for spent fuel shipping. This structure is classified a seismic Category I structure up to elevation 286 ft. The portion of the building above elevation 286 ft is classified as nonseismic. The SGTB is a two-story, reinforced concrete and steel-framed structure. The structure shares a common wall with the railroad access lock adjacent to the RB. The reinforced concrete floor slab is provided at the grade level of elevation 261 ft. A railroad access lock approximately 25 x 90 ft is provided adjacent to the RB. This building is a reinforced concrete and steel-framed structure and shares a common wall with the SGTB.

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

The entire SGTB is made up of components that require an AMR.

USAR Reference(s)

More information about the SGTB can be found in USAR Section 3.8.4.1.9.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the SGTB and their intended functions are shown in Table 2.4.B.12-1. The AMR results for these component types are provided in Table 3.5.2.B-12.

Table 2.4.B.12-1
NMP2 Standby Gas Treatment Building

Component Type	Intended Functions
Concrete in Air	Fire Barrier Flood Protection HELB Shielding Missile Barrier Shelter/Protection Structural/Functional Support
Concrete in Soil Above the GWT	Flood Protection Shelter/Protection Structural/Functional Support
Concrete in Soil Below the GWT	Flood Protection Shelter/Protection Structural/Functional Support
Concrete Lean Fill in Soil Above the GWT	Structural/Functional Support
Concrete Lean Fill in Soil Below the GWT	Structural/Functional Support
Doors	Fire Barrier
	Fire Barrier HELB Shielding
	Fire Barrier Pressure Boundary
	Missile Barrier
	Missile Barrier Pressure Boundary
	Structural Support for NSR
Fasteners (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	Structural/Functional Support
Structural Steel (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR

2.4.B.14 NMP2 TURBINE BUILDING

Description

The NMP2 Turbine Building (TB) complex includes the TB, heater bays, main steam tunnel, and condensate demineralizer regenerative and offgas area. A portion of the TB, main steam tunnel area, and offgas area are analyzed to seismic conditions, whereas the remaining portions are designed as nonseismic. The complex houses the turbine generator, condenser, moisture separator, etc., in the TB areas, heaters and related pumps and accessories in heater bay areas, and offgas system equipment and tanks in offgas areas. The main steam tunnel connects the TB with the RB.

The TB complex is constructed partially on spread footings and partially on a mat foundation. This building complex is constructed of reinforced concrete floors and walls up to the operating floor level. The TB's operating floor is concrete supported by steel deck and beams. The structure above the operating floor level is constructed of a structural steel framing system braced by vertical and horizontal bracing systems up to roof level, enclosed by metal siding. A steel roof deck with roofing is provided at the top of the structure.

This structure is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

The entire TB is made up of components that require an AMR.

USAR Reference(s)

More information about the TB can be found in USAR Section 3.8.4.1.12.

License Renewal Drawings

- LR-NMP-S-1, Revision 0, License Renewal Site Plan

Components Subject to an AMR

The component types requiring an AMR for the TB and their intended functions are shown in Table 2.4.B.13-1. The AMR results for these component types are provided in Table 3.5.2.B-13.

Table 2.4.B.13-1
NMP2 Turbine Building

Component Type	Intended Functions
Block Wall in Air	Fire Barrier
Concrete in Air	Fire Barrier Radiation Shielding Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete in Soil Above the GWT	Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete in Soil Below the GWT	Shelter/Protection Structural/Functional Support Structural Support for NSR
Concrete Lean Fill in Soil Below the GWT	Structural/Functional Support
Doors	Fire Barrier
	Fire Barrier Flood Protection
	Fire Barrier Radiation Shielding
	Flood Protection Shelter/Protection
Expansion/Grouted Anchors (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Fasteners (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	Pipe Whip Restraint Structural/Functional Support
Fasteners (Wrought Austenitic Stainless Steel) in Air	Pipe Whip Restraint
Structural Steel (Carbon and Low Alloy Steel) in Air	Radiation Shielding Shelter/Protection Structural/Functional Support Structural Support for NSR

2.4.C NMPNS STRUCTURAL COMMODITIES

The structural commodities for NMPNS are described in the following sections:

- Component Supports (Section 2.4.C.1)
- Fire Stops and Seals (Section 2.4.C.2)

2.4.C.1 COMPONENT SUPPORTS

Description

Component supports are connections between a system component and a plant structural member such as a concrete wall or floor or structural steel beam or column. Supports for both the distributive portions of systems and equipment, such as pumps and pressure vessels, are included as part of this commodity group. Supported components include vessels, piping, passive pump components, and heat exchangers. Supports for electrical cables, cable trays, conduits, HVAC ducting, MCC cabinets, electrical enclosures, fans, filters, and heaters are also included in this commodity. Seismic restraints, which may or may not provide support during normal operation, are also considered part of this commodity.

NMP1 was licensed prior to the issuance of 10 CFR 50 Appendix A. General Design Criteria 4 of Appendix A required protection against the dynamic effects of pipe rupture or an analysis to demonstrate very low probability of rupture of high energy lines. As such, there are no pipe whip (high-energy line break) restraints. As stated in NMP1 USAR Section XV.C.2.2.4, the ability to cope with the consequences of high-energy line pipe ruptures is reviewed on a refuel cycle basis to assure that new fuel types/designs do not change the conclusions of these coping studies.

For NMP2, pipe whip restraints are evaluated as part of the structure rather than under the component supports commodity.

Some structural elements also have an intended function of structural support for components, but are evaluated with the structure rather than as part of this commodity because they form an integral part of the structure. An example of such an element is the reactor pedestal, which supports the reactor and biological shield wall but is considered part of the primary containment. For license renewal purposes, the boundaries of component supports are the surface of the structure and the surface of the component, except for welded or integrally cast or forged attachments to the component. For supports welded directly to the component, the boundary for license renewal purposes includes the weld to the component. For integrally cast or forged attachments to the component, these are not considered part of the support; however, the weld joining the support to the integral attachment is considered part of the support. For embedded anchor bolts associated with component supports, the portion protruding above the concrete is considered part of the component supports system, while the embedded portion of the anchor bolt is considered to be part of the concrete asset which is included under the associated structure. Note that these boundaries differ from and overlap with the ASME Section XI examination boundaries. The active portion of snubber supports screens out for license renewal purposes, but the passive portions are subject to aging management review.

This commodity is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).

The components subject to an AMR include all component supports as described above.

USAR Reference(s)

More information about the Component Supports can be found in NMP1 USAR Sections XV.C.2.2.4 and XVI.D.1.2, and NMP2 USAR Sections 3.9A.3.4 and 3.9B.3.4.

License Renewal Drawings

None

Components Subject to an AMR

The component types requiring an AMR for the Component Supports and their intended functions are shown in Table 2.4.C.1-1. The AMR results for these component types are provided in Table 3.5.2.C-1.

Table 2.4.C.1-1
Component Supports

Component Type	Intended Functions
Copper Alloy (Zinc < 15%) in Air, Relative Motion (NMP1 only)	Structural/Functional Support Structural Support for NSR
Copper Alloy (Zinc ≥ 15%) in Air, Relative Motion (NMP2 only)	Structural/Functional Support Structural Support for NSR
Epoxy Grout in Air (NMP2 only)	Structural/Functional Support
Expansion/Grouted Anchors (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Expansion/Grouted Anchors (Wrought Austenitic Stainless Steel) in Air (NMP2 only)	Structural/Functional Support
Fasteners (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Fasteners (Precipitation Hardenable) in Air (NMP1 only)	Structural/Functional Support Structural Support for NSR
Grout in Air	Structural/Functional Support Structural Support for NSR
Polymeric Supports in Air with Vibratory Motion	Structural/Functional Support Structural Support for NSR
Structural Steel (Carbon and Low Alloy Steel) in Air	Structural/Functional Support Structural Support for NSR
Structural Steel (Carbon and Low Alloy Steel) in Soil Above the GWT (NMP2 only)	Structural/Functional Support Structural Support for NSR
Structural Steel (Precipitation Hardenable) in Air (NMP2 only)	Structural/Functional Support Structural Support for NSR
Structural Steel (Wrought Austenitic Stainless Steel) in Air	Structural/Functional Support Structural Support for NSR
Structural Steel (Wrought Austenitic Stainless Steel) in Air, Relative Motion (NMP2 only)	Structural/Functional Support Structural Support for NSR
Structural Steel (Wrought Austenitic Stainless Steel) in Treated Water	Structural/Functional Support Structural Support for NSR

2.4.C.2 FIRE STOPS AND SEALS

Description

The Fire Stops and Seals Commodity addresses penetration fire stop/seal materials and also structural fire seal materials. The following items are not included under this commodity:

- Process piping, electrical cables, or conduits running through the fire penetration; these are included under the associated mechanical or electrical system,
- Cast in place penetration sleeves and any flanges or welds; these are evaluated as part of the structural steel asset associated with the structure,
- Embedded portions of cast-in-place sleeves; these are included under the concrete asset for the structure, and
- Fire barrier walls, which are included under the structure.

This commodity is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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).

The components subject to an AMR include all fire stops and seals as described above.

USAR Reference(s)

More information about the Fire Stops and Seals can be found in NMP1 USAR Section X.10A.2.4.1.10 and NMP2 USAR Sections 9A.3.5.1.1, 9A.3.5.1.2, and 9A.3.5.1.3.

License Renewal Drawings

None

Components Subject to an AMR

The component types requiring an AMR for the Fire Stops and Seals and their intended functions are shown in Table 2.4.C.2-1. The AMR results for these component types are provided in Table 3.5.2.C-2.

Table 2.4.C.2-1
Fire Stops and Seals

Component Type	Intended Functions
Aluminum Alloy in Air (NMP1 only)	Fire Barrier
Fasteners (Wrought Austenitic Stainless Steel) in Air	Fire Barrier
Fire Stop in Air	Fire Barrier
Fire Wrap in Air	Fire Barrier
Structural Steel (Carbon and Low Alloy Steel) in Air (NMP2 only)	Fire Barrier

2.5 SCOPING AND SCREENING RESULTS: ELECTRICAL AND INSTRUMENTATION AND CONTROLS SYSTEMS

The determination of electrical systems within the scope of license renewal is made by initially identifying NMPNS Electrical and Instrumentation and Controls (I&C) Systems and their design functions. Each system is then reviewed to determine those that satisfy one or more of the criteria contained in 10 CFR 54.4. This process is described in Section 2.1 and the results of the Electrical and I&C Systems review are included in Section 2.2. Section 2.1 also provides the methodology for determining the components within the scope of 10 CFR 54.4 that meet the requirements contained in 10 CFR 54.21(a)(1). The components that meet these screening requirements are identified in this section. These identified components require an aging management review for license renewal.

The NMP1 and NMP2 Electrical and I&C Systems are described in Section 2.5.A and Section 2.5.B, respectively. Additionally, electrical commodities are described in Section 2.5.C and supports for electrical cables, cable trays, conduits, cabinets, and enclosures are addressed in the Component Supports Commodity (Section 2.4.C.1). These commodities apply to both NMP1 and NMP2.

2.5.A NMP1 ELECTRICAL AND I&C SYSTEMS

The NMP1 Electrical and I&C Systems that are within scope are listed below:

- NMP1 24V DC Electrical Distribution System (Section 2.5.A.1)
- NMP1 125V DC Electrical Distribution System (Section 2.5.A.2)
- NMP1 120V AC Electrical Distribution System (Section 2.5.A.3)
- NMP1 600V AC Electrical Distribution System (Section 2.5.A.4)
- NMP1 4.16KV AC Electrical Distribution System[1] (Section 2.5.A.5)
- NMP1 115KV AC Electrical Distribution System[1] (Section 2.5.A.6)
- NMP1 Anticipated Transients Without Scram System (Section 2.5.A.7)
- NMP1 Communications System (Section 2.5.A.8)

[1] These systems comprise the NMP1 Switchyard

- NMP1 Plant Lighting System (Section 2.5.A.9)
- NMP1 Plant Process Computer System (Section 2.5.A.10)
- NMP1 Reactor Protection System (Section 2.5.A.11)
- NMP1 Remote Shutdown System (Section 2.5.A.12)

The following electrical system is within scope but is addressed in the Auxiliary Systems section since it contains mechanical components that are subject to an AMR:

- NMP1 Neutron Monitoring System (Section 2.3.3.A.13)

2.5.A.1 NMP1 24V DC ELECTRICAL DISTRIBUTION SYSTEM

System Description

The NMP1 24V DC Electrical Distribution (24VDC) System provides electrical power to the Neutron Monitoring System (Section 2.3.3.A.13) and certain process radiation monitors. The 24VDC System includes two independent systems consisting of battery chargers, batteries, nuclear instrumentation buses, circuit breakers, fuses, and switches. Normally the battery chargers both supply power to the system loads and maintain the batteries charged. If a loss of the normal power supply occurs, the batteries can supply the system loads for a minimum of four hours. AC power for this system is supplied from the 120 VAC System.

This system is in scope for license renewal for the following reason:

- It performs a safety-related function per 10 CFR 54.4(a)(1).

USAR Reference(s)

More information about the 24VDC System can be found in USAR Section IX.B.2.1.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components in the 24VDC System that are subject to an AMR are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.A.2 NMP1 125V DC ELECTRICAL DISTRIBUTION SYSTEM

System Description

The NMP1 125V DC Electrical Distribution (125VDC) System supplies power to Reactor Protection System loads (Section 2.5.A.11), emergency lube oil pumps, valve operators, fire protection system equipment, and various system and component indication and protection instrumentation. The 125VDC System consists of batteries, static chargers, and battery boards. The batteries are kept fully charged by the static chargers. The static chargers also provide the DC power required for normal station operation as long as Alternating Current (AC) power is available. AC Power for this system is supplied by the 600 VAC System (Section 2.5.A.4).

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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), and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the 125VDC System can be found in USAR Section IX.B.4.3.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components in the 125VDC System that are subject to an AMR are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.A.3 NMP1 120V AC ELECTRICAL DISTRIBUTION SYSTEM

System Description

The NMP1 120V AC Electrical Distribution (120VAC) System provides a reliable source of power for systems operating at 120VAC, which are required to be operational for station power production and for the shutdown and maintenance of the station in a safe shutdown condition under all postulated events and accident scenarios. The equipment powered by the 120VAC System includes Reactor Protection System loads (Section 2.5.A.11), various system and component instrumentation, the plant process computer, protection and control loads, solenoid operated valves, and alarm interposing relays for Control Room annunciators. The 120VAC System includes Uninterruptible Power Supplies (UPS) and Motor Generator (MG) sets. The safety related 120VAC System is divided into physically separate and electrically independent trains that perform redundant safety functions. Power for this system is supplied by the 600 VAC System (Section 2.5.A.4).

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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), and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the 120VAC System can be found in USAR Section IX.B.2.2.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components in the 120VAC System that are subject to an AMR are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.A.4 NMP1 600V AC ELECTRICAL DISTRIBUTION SYSTEM

System Description

The NMP1 600V AC Electrical Distribution (600VAC) System is designed to provide a reliable source of power for equipment required to be operational for station power production and for the shutdown and maintenance of the station in a safe shutdown condition under design events and accident scenarios. The 600VAC System includes the various 600VAC power boards, Motor Control Centers (MCCs), associated 4160/600V transformers, and power distribution circuit breakers. Power to the 600VAC System is supplied by the 4.16 KV AC System (Section 2.5.A.5).

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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), and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the 600VAC System can be found in USAR Sections IX.B.2 and XV.B.3.25.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components in the 600VAC System that are subject to an AMR are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.A.5 NMP1 4.16KV AC ELECTRICAL DISTRIBUTION SYSTEM

System Description

The NMP1 4.16KV AC Electrical Distribution (4.16KVAC) System is designed to provide a reliable source of power for equipment required to be operational for station power production, and for the shutdown and maintenance of the station in a safe shutdown condition under all possible design events and accident scenarios. The 4.16KVAC System includes the 24KV/4.16KV station transformer, 115KV/4.16KV reserve transformers, 4.16KV powerboards, and the 4.16KV power distribution circuit breakers. Power to the 4.16KVAC System is normally supplied by the main generator and the 115KV AC Electrical Distribution System (Section 2.5.A.6). The safety-related 4.16 KV AC Power Boards are supplied by the emergency diesel generators in the event of a Loss of Offsite Power (LOOP) event.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the 4.16KVAC System can be found in USAR Section IX.B.1.2.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components in the 4.16KVAC System that are subject to an AMR are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.A.6 NMP1 115KV AC ELECTRICAL DISTRIBUTION SYSTEM

System Description

The NMP1 115KV AC Electrical Distribution (115KVAC) System is designed to provide a reliable source of offsite power for equipment required to be operational for station power production and for the shutdown and maintenance of the station in a safe shutdown condition under design events, and accident scenarios. The 115KVAC System includes two redundant and independent trains containing disconnect switches, breakers, and distribution bus. This system is relied upon to recover the unit from an SBO event by providing a source of offsite power. The electric grid provides power for the system.

This system is in scope for license renewal for the following reason:

- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the 115KVAC System can be found in USAR Section IX.B.1.2.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the 115KVAC System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.A.7 NMP1 ANTICIPATED TRANSIENTS WITHOUT SCRAM SYSTEM

System Description

The NMP1 Anticipated Transients Without Scram (ATWS) System is designed to provide a rapid power reduction should a reactor scram fail to occur during a reactor vessel water level or pressure transient. The ATWS System has two separate sub-systems, Reactor Recirculation Pump Trip (ATWS/RPT) and Alternate Rod Insertion (ATWS/ARI). The ATWS/RPT System will initiate a power reduction by tripping the Reactor Recirculation Pumps, causing a reduction in flow through the reactor core. The ATWS/ARI operates a series of 125VDC solenoid valves to vent air pressure off the scram air header and allow all control rods to fully insert. The ATWS System consists of switches, breakers, indicators, fuses, system panels, and relays providing interconnection with other systems.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for anticipated transients without scram (10 CFR 50.62).

USAR Reference(s)

More information about the ATWS System can be found in USAR Section VIII.A.1.2.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the ATWS System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.A.8 NMP1 COMMUNICATIONS SYSTEM

System Description

The NMP1 Communications System includes a dial telephone system, a station intercom / paging system, a maintenance system (portable headsets) and station radios. These systems are powered from the 125 VDC Electrical Distribution System (Section 2.5.A.2) either directly or indirectly via the Reactor Protection System (Section 2.5.A.11) buses.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the Communications System can be found in USAR Section X.10A.2.4.5.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Communications System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.A.9 NMP1 PLANT LIGHTING SYSTEM

System Description

The NMP1 Plant Lighting System is designed to provide adequate lighting in necessary areas during normal and emergency operating conditions. The Plant Lighting System consists of the following lighting subsystems:

- Normal Station Lighting - The Normal Station Lighting System provides lighting in all areas of the Station under normal operating conditions.
- Emergency AC Lighting - The Emergency AC Lighting System provides lighting in selected areas to allow operators and maintenance personnel to perform necessary operations and repairs.
- Emergency Control Room DC Lighting – The Emergency Control Room DC Lighting System provides lighting in the Control Room for plant operation upon a loss of normal lighting.
- Emergency Battery Lighting - The Emergency Battery Lighting System provides lighting in areas required for operation of any safe shutdown equipment and their access and egress routes.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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), and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the Plant Lighting System can be found in USAR Section X.10A.2.4.5.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Plant Lighting System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.A.10 NMP1 PLANT PROCESS COMPUTER SYSTEM

System Description

The NMP1 Plant Process Computer System monitors and records plant process variables, and performs calculations with selected input data. This system also provides safety-related isolation between the fiberoptics connections of Local Power Range Monitors, Axial Power Range Monitors, High Pressure Coolant Injection (HPCI) signals, and the plant computer.

This system is in scope for license renewal for the following reason:

- It performs a safety-related function per 10 CFR 54.4(a)(1).

USAR Reference(s)

More information about the Plant Process Computer System can be found in USAR Section VIII.C.4.1.1.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Plant Process Computer System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.A.11 NMP1 REACTOR PROTECTION SYSTEM

System Description

The NMP1 Reactor Protection System (RPS) is designed to provide automatic and manual initiation of a reactor scram as well as automatic initiation of containment and reactor vessel isolation and safety system actuation. The RPS is a dual-redundant, fail-safe system, which consists of two independent logic channels. Each logic channel has its own input sensors, output pilot scram solenoid valves, backup scram valves, and source of power. Within each logic channel are two identical subchannels of tripping devices. Thus, the system has a total of four independent subchannels and operates on a one-out-of-two taken twice logic to initiate any automatic actions.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the Reactor Protection System can be found in USAR Section VIII.A.1.1.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Reactor Protection System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.A.12 NMP1 REMOTE SHUTDOWN SYSTEM

System Description

The Remote Shutdown System is designed to provide plant operators with hot shutdown capability independent of the main and auxiliary control rooms. The Remote Shutdown System was designed to safely achieve hot shutdown during a fire, which causes a functional loss and/or evacuation of the main and auxiliary control rooms. The Remote Shutdown System consists of two independent panels which contain the required switches and instrumentation to scram the reactor, achieve and maintain a hot shutdown condition, and monitor selected plant parameters.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains NSR SCs whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1).
- It contains SCs 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).

USAR Reference(s)

More information about the Remote Shutdown System can be found in USAR Section X.L.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Remote Shutdown System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B NMP2 ELECTRICAL AND I&C SYSTEMS

The NMP2 Electrical and I&C Systems that are within scope are listed below:

- NMP2 13.8KV AC Electrical Distribution System (Section 2.5.B.1)
- NMP2 4.16KV AC Electrical Distribution System (Section 2.5.B.2)
- NMP2 Battery-24V-Station System (Section 2.5.B.3)
- NMP2 Common Electrical System (Section 2.5.B.4)
- NMP2 Communications Paging System (Section 2.5.B.5)
- NMP2 Communications Telephone System (Section 2.5.B.6)
- NMP2 Emergency DC Distribution System (Section 2.5.B.7)
- NMP2 Emergency Uninterruptible Power Supplies (UPS) System (Section 2.5.B.8)
- NMP2 Feedwater Control System (Section 2.5.B.9)
- NMP2 Heat Tracing System (Section 2.5.B.10)
- NMP2 Information Handling Annunciator System (Section 2.5.B.11)
- NMP2 Motor Control Center Emergency System (Section 2.5.B.12)
- NMP2 Normal AC High Voltage Distribution System (Section 2.5.B.13)
- NMP2 Normal DC Distribution System (Section 2.5.B.14)
- NMP2 Normal UPS System (Section 2.5.B.15)
- NMP2 Process Computer System (Section 2.5.B.16)
- NMP2 Reactor Protection Motor Generator System (Section 2.5.B.17)
- NMP2 Reactor Protection System (Section 2.5.B.18)
- NMP2 Redundant Reactivity Control System (Section 2.5.B.19)
- NMP2 Remote Shutdown System (Section 2.5.B.20)

- NMP2 Reserve Station Service Transformers System (Section 2.5.B.21)
- NMP2 Standby and Emergency AC Distribution System (Section 2.5.B.22)
- NMP2 Standby Diesel Generator Protection (Breaker) System (Section 2.5.B.23)
- NMP2 Startup Transient Analysis System (Section 2.5.B.24)
- NMP2 Station Control Bus Nonvital AC Supply System (Section 2.5.B.25)
- NMP2 Station Control Bus Nonvital Indication System (Section 2.5.B.26)
- NMP2 Station Control Bus Vital AC Supply System (Section 2.5.B.27)
- NMP2 Station Lighting System (Section 2.5.B.28)
- NMP2 Switchyard System (Section 2.5.B.29)[2]
- NMP2 Synchronizing - Diesel Generator System (Section 2.5.B.30)
- NMP2 Unit Substation Emergency AC Controls and Heater Supply System (Section 2.5.B.31)
- NMP2 Unit Substation Emergency System (Section 2.5.B.32)
- NMP2 Unit Substation System (Section 2.5.B.33)
- NMP2 UPS Distribution System (Section 2.5.B.34)

The following electrical systems are within scope but are evaluated in the Auxiliary System section since they contain mechanical components that are subject to an AMR:

- NMP2 Containment Atmosphere Monitoring System (Section 2.3.3.B.6)
- NMP2 Containment Leakage Monitoring System (Section 2.3.3.B.7)
- NMP2 Neutron Monitoring System (Section 2.3.3.B.19)

[2] The equivalent NMP1 System consists of the NMP1 4.16KV AC Electrical Distribution System and the NMP1 115KV AC Electrical Distribution System.

- NMP2 Standby Diesel Generator Protection (Generator) System (Section 2.3.3.B.30)

2.5.B.1 NMP2 13.8KV AC ELECTRICAL DISTRIBUTION SYSTEM

System Description

The NMP2 13.8KV AC Electrical Distribution (13.8KVAC) System delivers power from either the main generator or offsite sources (115KV or 345KV systems) to non-safety related 4.16KV and 600V onsite power systems. This system also provides power to normal (non-safety-related) 13.8 KV busses and emergency (safety-related) 13.8 KV busses. The normal 13.8 KV busses feed the safety related 13.8 KV busses under normal conditions, as well as the plant's 13.8KV non-safety motor loads. Two auxiliary electric boilers are also powered from the 13.8 KV winding of the auxiliary boiler transformer. Under normal conditions, the Reserve Station Service Transformers System (Section 2.5.B.21) is a backup source. The 13.8 KV busses also provide power for the reactor recirculation pump motors through the emergency portion of the 4.16KV AC Electrical Distribution System (Section 2.5.B.2)

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

- It contains SCs 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), and anticipated transients without scram (10 CFR 50.62).

USAR Reference(s)

More information about the 13.8KVAC System can be found in USAR Section 8.3.1.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the 13.8KVAC System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.2 NMP2 4.16KV AC ELECTRICAL DISTRIBUTION SYSTEM

System Description

The NMP2 4.16KV AC Electrical Distribution (4.16KVAC) System provides a reliable source of AC power for equipment required for normal plant operation, shutdown, and maintenance under all postulated design basis accident scenarios. The normal distribution system provides power from the normal (non-safety-related) 13.8KV busses to the non safety related loads, auxiliary, and service loads through the 4.16KV busses, which also feed normal 600V load centers. The normal distribution system provides power to the non-safety-related loads, auxiliary, and service loads through the 4.16KV busses, which also feed normal 600V load centers. The normal distribution portion of the 4.16KVAC System consists of the switchgear busses, their associated breakers, and the step-down transformers. The emergency distribution portion of the 4.16KVAC System consists of busses, powered from offsite via the Reserve Station Service Transformers System (Section 2.5.B.21). These emergency busses make up three divisions of the plant emergency power, and have their own dedicated emergency diesel generator in the event of a Loss of Coolant Accident (LOCA) or LOOP. These busses supply the emergency 600V load centers (Division I and II) and the High Pressure Core Spray System (Section 2.3.2.B.3) MCCs (Division III). In the case of a LOOP, the system automatically transfers emergency 4.16 KV power sources from the offsite source to the EDGs.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the 4.16KVAC System can be found in USAR Section 8.3.1.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the 4.16KVAC System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.3 NMP2 BATTERY-24V-STATION SYSTEM

System Description

The NMP2 Battery-24V-Station (B24V) System is part of the 24VDC power system. It provides redundant DC power sources for the Neutron Monitoring System (Section 2.3.3.B.19). Each of the redundant sources consists of a bus, 24VDC batteries, and 24VDC battery chargers. Each charger is connected to the same busses as its associated battery. Each 24VDC battery has a normal battery charger capable of carrying the maximum continuous steady-state loads on the battery while recharging the battery from the design minimum charge state to the fully charged state. Each charger is fed from a 600V stub bus distribution panel through a 600-120/240V distribution transformer.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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) and anticipated transients without scram (10 CFR 50.62).

USAR Reference(s)

More information about the B24V System can be found in USAR Section 8.1.5.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the B24V System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.4 NMP2 COMMON ELECTRICAL SYSTEM

System Description

The NMP2 Common Electrical System provides control functions and equipment for components controlled from outside the control room. The Common Electrical System, which also includes the Common Electrical System – Control Room Complex (i.e. controlled from the Control Room), contains a variety of components including panels, cabinets, electrical penetrations (including primary containment electrical penetrations), cables, circuit breakers, switches, and indicators.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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), and anticipated transients without scram (10 CFR 50.62).

USAR Reference(s)

None

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Common Electrical System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.5 NMP2 COMMUNICATIONS PAGING SYSTEM

System Description

The NMP2 Communications Paging System provides for communication between various buildings and locations. The plant emergency alarms and evacuation signals are provided by this system, and it contains safety-related electrical penetrations. The system's loudspeakers form two physically and electrically independent subsystems to ensure redundant paths of communication throughout the plant. Handset stations are located so that they will meet the minimum requirements for manual fire alarm pull stations. This system is powered from the plant normal UPS system (Section 2.5.B.34).

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the Communications Paging System can be found in USAR Section 9.5.2.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Communications Paging System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.6 NMP2 COMMUNICATIONS TELEPHONE SYSTEM

System Description

The NMP2 Communications Telephone System consists of dial-type telephone sets located in selected areas within NMP2. The Communications Telephone System is powered from the 120VAC portion of the Normal UPS System (Section 2.5.B.15).

This system is in scope for license renewal for the following reason:

- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the Communications Telephone System can be found in USAR Section 9.5.2.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Communications Telephone System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.7 NMP2 EMERGENCY DC DISTRIBUTION SYSTEM

System Description

The Emergency DC Distribution System provides emergency 125VDC control power to the emergency (safety related) DC power system instrumentation, control, protection loads, and DC motors from the 600V emergency load centers. During a loss of AC power, DC control power is provided for at least two hours. The Emergency DC Distribution System includes DC switchgear/breakers, distribution panels, associated breakers, cables, busses, raceways, and indicators.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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), and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the Emergency DC Distribution System can be found in USAR Section 8.3.2.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Emergency DC Distribution System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.8 NMP2 EMERGENCY UNINTERRUPTIBLE POWER SUPPLIES (UPS) SYSTEM

System Description

The NMP2 Emergency UPS System consists of 25KVA, 120V, single-phase UPS units and their associated distribution panels. The UPS units are normally fed from the Emergency Distribution System Division I and II subsystems (600VAC) with the emergency lighting bus as an alternate AC source. Additionally, the 125VDC emergency power system can also be used as a backup source of DC power. The UPS units provide power for the Emergency Core Cooling System instrumentation and control loads.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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), and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the Emergency UPS System can be found in USAR Sections 8.3.1 and 8.3.2.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Emergency UPS System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.9 NMP2 FEEDWATER CONTROL SYSTEM

System Description

The NMP2 Feedwater Control System controls the flow of feedwater into the reactor vessel to maintain the vessel water level within predetermined limits during all normal plant operating modes. The Feedwater Control System utilizes vessel water level, steam flow, and feedwater flow to measure the water level in the reactor vessel, the feedwater flow rate into the reactor vessel, and the steam flow rate from the reactor vessel. During operation, these measurements are used for controlling feedwater flow. In the event of an ATWS, the Feedwater Control System initiates feedwater flow runback logic in conjunction with the recirculation flow runback to reduce reactor power.

This system is in scope for license renewal for the following reason:

- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for anticipated transients without scram (10 CFR 50.62).

USAR Reference(s)

More information about the Feedwater Control System can be found in USAR Section 7.7.1.3.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Feedwater Control System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.10 NMP2 HEAT TRACING SYSTEM

System Description

The NMP2 Heat Tracing System is designed to maintain the temperature of various plant process piping system and component temperatures within a predetermined value. Systems supported by the Heat Tracing System include the Standby Liquid Control System (Section 2.3.3.B.31), Post Accident Sampling System [part of the Process Sampling System (Section 2.3.3.B.21)], and Nitrogen System [part of the Compressed Air Systems (Section 2.3.3.B.5)]. Process piping and components associated with the Standby Liquid Control System must be maintained at a temperature, which will prevent precipitation of the sodium pentaborate from the solution during storage. Heat tracing is present on the lines to and from the hydrogen and oxygen analyzers. The heat tracing is designed to be available after a LOCA to maintain the temperature of the inlet gases higher that the saturation temperature for containment pressures after a LOCA. The nitrogen piping associated with containment inerting located in the yard area is provided with heat tracing to maintain the piping temperature at predetermined values.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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) and environmental qualification (10 CFR 50.49).

USAR Reference(s)

More information about the Heat Tracing System can be found in USAR Appendix 6C, Section 6.4.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Heat Tracing System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.11 NMP2 INFORMATION HANDLING ANNUNCIATOR SYSTEM

System Description

The NMP2 Information Handling Annunciator System aids personnel during normal, abnormal, and emergency conditions in determining the status of various plant SSCs and in assessing conditions that may warrant corrective actions. The Information Handling Annunciator System consists of components that feed the information from the field to the annunciator system in the control room, the majority of which are optical isolators that carry safety and non-safety signals from the plant into the control room.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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) and environmental qualification (10 CFR 50.49).

USAR Reference(s)

More information about the Information Handling Annunciator System can be found in USAR Section 7.1.2.3.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Information Handling Annunciator System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.12 NMP2 MOTOR CONTROL CENTER EMERGENCY SYSTEM

System Description

The NMP2 Motor Control Center (MCC) Emergency System is the onsite 600V emergency AC power system that supplies power to the safety related 600V emergency motor loads from the emergency (safety related) 4.16 KV busses. It is designed to power the equipment, systems, and loads required to safely shut down the reactor through the MCCs. The MCC Emergency System is divided into redundant independent divisions (i.e., Division I and II of the plants emergency electrical distribution system) that are electrically isolated and physically separated from each other, and powered from the Unit Substation Emergency System (Section 2.5.B.32).

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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), and anticipated transients without scram (10 CFR 50.62).

USAR Reference(s)

More information about the Motor Control Center Emergency System can be found in USAR Section 8.3.1.1.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Motor Control Center Emergency System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.13 NMP2 NORMAL AC HIGH VOLTAGE DISTRIBUTION SYSTEM

System Description

The NMP2 Normal AC High Voltage Distribution System consists of 600V MCCs which receive power from the normal 600V busses. The MCCs feed plant auxiliary motor loads, motor operated valves, and other loads. The 600V distribution panels feed the 120/240V and 120/208V distribution panels either directly via 120/240V or 120/208V distribution transformers, or through the plant UPS system, or lighting panels. The MCCs are a two-bus design to increase the reliability of supplying power.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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) and anticipated transients without scram (10 CFR 50.62).

USAR Reference(s)

More information about the Normal AC High Voltage Distribution System can be found in USAR Section 8.3.1.1.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Normal AC High Voltage Distribution System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.14 NMP2 NORMAL DC DISTRIBUTION SYSTEM

System Description

The NMP2 Normal 125 VDC Distribution System supplies 125VDC to normal switchgear, main transformer, reserve station service transformers, auxiliary boiler transformers, and other non-safety related systems. This system consists of batteries, battery chargers, DC switchgear, and distribution panels. Each battery is fed by a 600V bus under normal power conditions. This system is relied upon to supply power for plant lighting loads. Each of the non safety related batteries, under normal operating conditions, is fed by a 600VAC charger supplied by a stub-bus load center connected to a Standby Diesel Generator.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the Normal DC Distribution System can be found in USAR Section 8.3.2.1.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Normal DC Distribution System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.15 NMP2 NORMAL UPS SYSTEM

System Description

The NMP2 Normal UPS System powers a variety of non-safety loads such as local radiation monitors, communications, lighting, plant computer systems, and non-safety instrumentation. This system consists of a 5KVA, 120V, 1-phase unit, 10KVA, 120V, 1-phase units, and 75KVA, 120/208V, 3-phase UPS units, and their associated distribution panels. The 10KVA units provide power to the logic circuits for the Reactor Protection System (Section 2.5.B.18) and the safety-related MSIV control solenoids.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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) and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the Normal UPS System can be found in USAR Section 8.3.1.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Normal UPS System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.16 NMP2 PROCESS COMPUTER SYSTEM

System Description

The NMP2 Process Computer System is designed to provide a determination of the plant status through a series of operations and calculations; improve data reduction, accounting, and logging functions; and supplement procedural requirements for control and manipulation during plant reactor startup and shutdown. This system also includes the Plant Data Historian System, which stores the data for later analysis. The Process Computer System consists of interface devices of the computer itself with the parent systems that provide the input to the computer, such as isolators and cables, fuses and breakers, keyboards and displays, power supplies and panels.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49) and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the Process Computer System can be found in USAR Section 7.7.1.6.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Process Computer System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.17 NMP2 REACTOR PROTECTION MOTOR GENERATOR SYSTEM

System Description

The NMP2 Reactor Protection Motor Generator System supplies power to the Reactor Protection System (Section 2.5.B.18) solenoid-operated scram pilot valves via Motor Generators (MGs). The remainder of the system consists of the associated protective devices, distribution panels, and wiring. The scram pilot valve solenoids have an alternate power source from the plant's normal 600V power distribution system via a 600-120V, single phase, step-down transformer when an MG is out of service for maintenance. The MG motors receive power from the plant 600V MCCs.

This system is in scope for license renewal for the following reason:

- It performs a safety-related function per 10 CFR 54.4(a)(1).

USAR Reference(s)

More information about the Reactor Protection Motor Generator System can be found in USAR Sections 7.2.1 and 8.3.1.1.3.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Reactor Protection Motor Generator System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.18 NMP2 REACTOR PROTECTION SYSTEM

System Description

The NMP2 Reactor Protection System is designed to prevent the reactor from operating under unsafe or potentially unsafe conditions. The Reactor Protection System is designed to provide a signal to cause rapid insertion of control rods (scram) and shut down the reactor when specific variables exceed predetermined limits. The Reactor Protection System consists of independent, functionally identical trip systems. Each trip system is divided into independent, functionally identical trip subchannels. These subchannels consist of the sensors, relays, contacts, switches and trip units, which initiate a scram to prevent the reactor from operating under potentially unsafe conditions, and provide signals to the DC solenoid-operated backup scram valves in the Control Rod Drive System (2.3.1.B.5).

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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), and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the Reactor Protection System can be found in USAR Section 7.2.1.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Reactor Protection System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.19 NMP2 REDUNDANT REACTIVITY CONTROL SYSTEM

System Description

The NMP2 Redundant Reactivity Control System determines if there is an existing transient that exceeds certain Reactor Pressure Vessel (RPV) pressure and water level parameters and immediately activates ATWS prevention equipment. If the logic determines that a controlled shutdown is not occurring, the Redundant Reactivity Control System activates ATWS mitigation equipment. The Redundant Reactivity Control System is initiated in one of three ways: reactor vessel high dome pressure, reactor vessel low-low water level, or manually. The Redundant Reactivity Control System receives signals from other systems and processes the signals through its logic train. It then provides output signals to prevent an ATWS event by initiating an alternate rod injection, mitigate the consequences of an ATWS event by automatically initiating boron injection if reactor power is still too high, and limit the reactivity in the core. The Redundant Reactivity Control System includes cables, isolators and fuses from the sensors, transmitters, and controls to two logic panels. Each logic panel has independent channels, which when tripped by a single logic train will transmit a redundant reactivity control signal.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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), and anticipated transients without scram (10 CFR 50.62).

USAR Reference(s)

More information about the Redundant Reactivity Control System can be found in USAR Section 7.6.1.8.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Redundant Reactivity Control System are evaluated in Section 2.5.C, NMPNS Electrical

Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.20 NMP2 REMOTE SHUTDOWN SYSTEM

System Description

The Remote Shutdown System is designed to achieve a hot and then a cold reactor shutdown from outside the main control room. The Remote Shutdown System is required only when the main control room is inaccessible when normal plant operating conditions (or fires in the control room or relay room) exist. The system consists of relays, transmitters, indicators, annunciators, and switches.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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).

USAR Reference(s)

More information about the Remote Shutdown System can be found in USAR Section 7.4.1.4.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Remote Shutdown System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.21 NMP2 RESERVE STATION SERVICE TRANSFORMERS SYSTEM

System Description

The NMP2 Reserve Station Service Transformers System steps down the 115KV offsite power to some 13.8KV and 4.16KV portions of the NMP2 13.8KV AC Electrical Distribution System (Section 2.5.B.1) and the NMP2 4.16KV AC Electrical Distribution System (Section 2.5.B.2), respectively. The system consists of transformers and their associated support components: cables, raceways, switches, relays, and meters.

This system is in scope for license renewal for the following reason:

- It contains SCs 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) and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the Reserve Station Service Transformers System can be found in USAR Section 8.2.1.4.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Reserve Station Service Transformers System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.22 NMP2 STANDBY AND EMERGENCY AC DISTRIBUTION SYSTEM

System Description

The NMP2 Standby and Emergency AC Distribution System receives power from the emergency 600V busses for reliable power to safety-related loads and vital busses. It also supplies 120VAC power to vital division logic in order to initiate Emergency Core Cooling. The Standby and Emergency AC Distribution System consists of transformers, switches, fuses, breakers, cables, raceways, indicators, and electrical penetrations.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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), and anticipated transients without scram (10 CFR 50.62).

USAR Reference(s)

More information about the Standby and Emergency AC Distribution System can be found in USAR Section 8.3.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Standby and Emergency AC Distribution System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.23 NMP2 STANDBY DIESEL GENERATOR PROTECTION (BREAKER) SYSTEM

System Description

The NMP2 Standby Diesel Generator Protection (Breaker) System provides control logic for emergency diesel bus protection. System operation will trip the diesel generator breaker; it will not shutdown the Emergency Diesel Generator (EDG). The Standby Diesel Generator Protection (Breaker) System functions independent of the EDG.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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) and environmental qualification (10 CFR 50.49).

USAR Reference(s)

More information about the Standby Diesel Generator Protection (Breaker) System can be found in USAR Section 8.3.1.1.2.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Standby Diesel Generator Protection (Breaker) System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.24 NMP2 STARTUP TRANSIENT ANALYSIS SYSTEM

System Description

The NMP2 Startup Transient Analysis System provides a means for high speed data acquisition to monitor, record, and analyze process signals from various power plant subsystems. This data is used to compute and track thermal power and thermal limits, and demonstrate plant response to transients. This system interfaces with numerous safety and non-safety indications for plant parameters.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).
- It contains SCs 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), and environmental qualification (10 CFR 50.49).

USAR Reference

More information about the Startup Transient Analysis System can be found in USAR Section 7A.6.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Startup Transient Analysis System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.25 NMP2 STATION CONTROL BUS NONVITAL AC SUPPLY SYSTEM

System Description

The NMP2 Station Control Bus Nonvital AC Supply System contains 600V Non-Safety Related busses that provide power for miscellaneous lights, heaters, and 120V controls from the normal 600V busses. It also provides control power for fire detection. The Station Control Bus Nonvital AC Supply System consists of transformers, panels, switches, fuses, breakers, cables, raceways, indicators, and electrical penetrations.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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) and anticipated transients without scram (10 CFR 50.62).

USAR Reference(s)

More information about the Station Control Bus Nonvital AC Supply System can be found in USAR Section 8.3.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Station Control Bus Nonvital AC Supply System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.26 NMP2 STATION CONTROL BUS NONVITAL INDICATION SYSTEM

System Description

The NMP2 Station Control Bus Nonvital Indication System provides regulated 120 VAC instrumentation and control bus normal power through several fused distribution panels. The normal power distribution system supplies control power to several plant systems including circuits required for ATWS. It receives power from the 600V NSR busses of the NMP2 Normal DC Distribution System (Section 2.5.B.14). The system contains transformers, cables, raceways, fuses, and electrical penetrations.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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), and anticipated transients without scram (10 CFR 50.62).

USAR Reference(s)

More information about the Station Control Bus Nonvital Indication System can be found in USAR Section 8.3.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Station Control Bus Nonvital Indication System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.27 NMP2 STATION CONTROL BUS VITAL AC SUPPLY SYSTEM

System Description

The NMP2 Station Control Bus Vital AC Supply System supplies 120 VAC to vital control circuits, from the emergency 600V busses, in support of the Standby and Emergency AC Distribution System (Section 2.5.B.22). This system also supplies AC control power to the loads of the Reactor Building Heating, Ventilation and Air Conditioning System and the Containment Atmosphere Monitoring System. This system consists of panels and their associated transformers, circuit breakers, cables, and electrical penetrations.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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) and environmental qualification (10 CFR 50.49).

USAR Reference(s)

More information about the Station Control Bus Vital AC Supply System can be found in USAR Section 8.3.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Station Control Bus Vital AC Supply System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.28 NMP2 STATION LIGHTING SYSTEM

System Description

The Station Lighting System is designed to provide adequate lighting in necessary areas during emergency and normal operating conditions. The Station Lighting System consists of the following lighting subsystems:

- Normal Station Lighting - The Normal Station Lighting System provides adequate lighting in all areas of the Station under normal operating conditions. This includes the Lighting AC Auxiliary Boiler Room System, Lighting AC Radwaste Building System, Lighting AC Reactor Building System, the Lighting AC Screenwell and Pumphouse System, the Lighting AC Service Building System, and the Lighting AC Turbine Area System.

- Emergency Lighting - The Emergency Lighting System provides adequate lighting required for operating the safety-related equipment during emergency conditions in the control room, DG rooms, emergency switchgear areas, and the relay and computer room. This system also provides lighting for passageways in areas where safety-related equipment is located.

- Essential Lighting - The Essential Lighting System provides partial lighting for certain critical areas requiring continuous lighting, such as the control room, the relay and computer room, standby DG rooms, emergency switchgear rooms, and the service water pump room. This system also provides lighting for passageways in areas where safety-related equipment is located.

- Egress Lighting - The Egress Lighting System provides adequate lighting for all egress signs inside the plant. This is designed as a separate system specifically for building egress under emergency conditions.

- Battery-pack Lighting - The Battery-pack Lighting System provides illumination in all areas required for operation of any safe shutdown equipment and their access and egress routes. The Battery-pack Lighting System also provides required illumination for access/egress to or from certain areas of the plant if the normal lighting in these areas is not available.

The Station Lighting System consists of supply breakers, relays, transformers, regulators, switches from the power supplies to the panels and light fixtures, and battery packs (including lights) for emergency lighting.

This system is in scope for license renewal for the following reasons:

- It performs safety-related functions per 10 CFR 54.4(a)(1).

- It contains SCs 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), and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the Station Lighting System can be found in USAR Section 9.5.3.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Station Lighting System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.29 NMP2 SWITCHYARD SYSTEM

System Description

The NMP2 Switchyard System is comprised of the 115KV switchyard support systems, the 345KV switchyard systems, the yard transformer systems, the station protection systems, and the generator synchronizing systems.

The 115KV switchyard support systems include the 115KV switchyard equipment and their support components from the offsite power supplies and the reserve station transformers. The 115KV switchyard support systems include the following subsystems:

- 115KV switchyard substation (Scriba)

- 115KV switchyard substation (NMP2)

- 115KV transmission line

The 345KV switchyard systems consist of cables, switches, and relays that route power from the main generator to the power grid. It also provides input to generator protection and turbine trips, and provides electrical fault signals for the protection of the 345KV lines. The 345KV switchyard systems include the following subsystems:

- 345KV transmission line
- 345KV switchyard substation

The yard transformer systems step up or step down voltage from the main generator via the main step-up transformer and its support components. They also provide power from the main generator stepped down from 25KV to 13.8KV for the plant's auxiliary and service loads via the station service transformer. The yard transformer systems include the following subsystems:

- Main transformer (including auxiliaries)
- Station service transformer normal (including auxiliaries)

The station protection systems provide protective signals and trips for the main, reserve, and normal station service transformers, the 115KV and 345KV switchyard, as well as the main generator. The station protection systems also supply protection relaying for the two reserve station transformers and auxiliary boiler transformer and their breakers. The station protection systems include the following subsystems:

- 115KV switchyard (Scriba and NMP2)
- 345KV Switchyard
- Station protection auxiliary boiler transformer
- Station protection generator
- Station protection main transformer
- Station protection reserve station service transformer
- Station protection normal station service transformer
- Station protection unit

The generator synchronizing systems provide the ability to parallel the main and normal station service transformers with their interconnecting electrical distribution systems. They also provide synchronization capability of the main generator with the 345KV-power system for offsite electrical delivery. The generator synchronizing systems include the following subsystems:

- Synchronizing main generator
- Synchronizing station service

This system is in scope for license renewal for the following reason:

- It contains SCs 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) and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the Switchyard System can be found in USAR Sections 8.1.3, 8.2.1, and 8.3.1.1.2.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Switchyard System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.30 NMP2 SYNCHRONIZING - DIESEL GENERATOR SYSTEM

System Description

The NMP2 Synchronizing - Diesel Generator System supports the Standby and Emergency AC Distribution System (Section 2.5.B.22) by preventing degradation of the power source during manual transfer from onsite to offsite power. This is accomplished by matching the voltage and the frequency of the incoming supply with the running supply from the diesel generator permitting the transfer of power sources with no interruption of power to the emergency system loads. This system consists of control switches, relays, and voltmeters.

This system is in scope for license renewal for the following reason:

- It performs a safety-related function per 10 CFR 54.4(a)(1).

USAR Reference(s)

More information about the Synchronizing - Diesel Generator System can be found in USAR Section 8.3.1.1.2.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Synchronizing - Diesel Generator System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.31 NMP2 UNIT SUBSTATION EMERGENCY AC CONTROLS AND HEATER SUPPLY SYSTEM

System Description

The NMP2 Unit Substation Emergency AC Controls and Heater Supply System supplies 120/240 VAC power to emergency heater and control circuits. It receives power from the Unit Substation Emergency System (Section 2.5.B.32). The Unit Substation Emergency AC Controls and Heater Supply System supplies loads in the Residual Heat Removal System (Section 2.3.2.B.7), Reactor Building Heating, Ventilation, and Air Conditioning System (Section 2.3.3.B.24), Low Pressure Core Spray System (Section 2.3.2.B.4), Spent Fuel Pool Cooling and Cleanup System (Section 2.3.3.B.28), Service Water System (Section 2.3.3.B.27), 13.8KV AC Electrical Distribution System (Section 2.5.B.1), 4.16KV AC Electrical Distribution System (Section 2.5.B.2), and the Control Building Chilled Water System (Section 2.3.3.B.8). The Unit Substation Emergency AC Controls and Heater Supply System consists of 600/120V transformers, cabling, panels, penetrations, and breakers to the loads that are physically located on the distribution panels.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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) and environmental qualification (10 CFR 50.49).

USAR Reference(s)

More information about the Unit Substation Emergency AC Controls and Heater Supply System can be found in USAR Section 8.3.1.1.2.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Unit Substation Emergency AC Controls and Heater Supply System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.32 NMP2 UNIT SUBSTATION EMERGENCY SYSTEM

System Description

The NMP2 Unit Substation Emergency System is part of the Emergency Distribution System. The system receives power from the 4.16kV AC emergency switchgear buses, and supplies power to 600V load centers, MCCs, and distribution transformers. The system supplies power to ESF Systems under all conditions of plant operation. This system consists of panels, transformers, circuit breakers, switches, indicators, penetrations, cables, and raceways.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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) and environmental qualification (10 CFR 50.49).

USAR Reference(s)

More information about the Unit Substation Emergency System can be found in USAR Section 8.3.1.1.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Unit Substation Emergency System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.33 NMP2 UNIT SUBSTATION SYSTEM

System Description

The NMP2 Unit Substation System consists of the plant normal 600V distribution system load centers, which feed NSR loads. The 600V normal load centers are double ended split buses fed from normal 13.8KV switchgear buses or double ended buses without tie breakers fed from the 4.16KV stub buses. The associated MCCs further distribute the loads. This system consists of panels, electrical penetrations, cables, and raceways.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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).

USAR Reference(s)

More information about the Unit Substation System can be found in USAR Section 8.3.1.1.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the Unit Substation System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.B.34 NMP2 UPS DISTRIBUTION SYSTEM

System Description

The NMP2 UPS Distribution System has several power sources. The preferred source is normal AC power input, which is converted into DC then inverted to AC and applied to the loads. On loss of the normal AC power supply, UPS loads will continue to be powered by the inverter, from the battery. This transition will occur without interruption of power to the UPS loads. Another power source (the maintenance supply or bypass AC) is also available to provide power to the UPS loads if the normal and battery sources are unavailable, or if the UPS will be shut down. This system consists of breakers, cables, electrical penetrations, raceways, junction boxes, and transformers.

This system is in scope for license renewal for the following reasons:

- It performs a safety-related function per 10 CFR 54.4(a)(1).
- It contains SCs 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), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

USAR Reference(s)

More information about the UPS Distribution System can be found in USAR Section 8.3.1.

License Renewal Drawings

None (see Components Subject to an AMR below)

Components Subject to an AMR

Electrical components requiring an AMR for the UPS Distribution System are evaluated in Section 2.5.C, NMPNS Electrical Commodities. Supports for electrical components are evaluated in Section 2.4.C.1. There are no other components subject to an AMR for this system.

2.5.C NMPNS ELECTRICAL COMMODITIES

This section presents the results of the screening process for electrical components evaluated as commodities. The list of electrical components subject to an AMR was determined on a plant-wide basis by compiling a list of all electrical component types installed in the plant, then applying the screening criteria of 10 CFR 54 to determine those component types subject to an AMR. All passive electrical components were considered to be within the scope of license renewal. Individual circuits were not evaluated to determine whether they were in scope. Furthermore, for many of the component types (e.g. cable), it was not possible to determine which system(s) applied to each component type. The resulting list is an encompassing list of component types, not individual components. For example, cable is listed as a component type. After applying the screening criteria discussed in Section 2.1.5.4, including NEI 95-10, the following electrical commodities were identified:

- Cables and Connectors (Section 2.5.C.1)
- Non-Segregated/Switchyard Bus (Section 2.5.C.2)
- Containment Electrical Penetrations (Section 2.5.C.3)
- Switchyard Components (Section 2.5.C.4)

As noted in Section 2.1.5.4, Electrical and I&C components associated with the 10 CFR 50.49 program (EQ) are replaced on a specified interval based on a qualified life. Therefore, components in the EQ program do not meet the “long-lived” criteria of 10 CFR 54.21(a)(1)(ii). They are “short-lived” per the regulatory definition and are not subject to AMR.

2.5.C.1 CABLES AND CONNECTORS

Description

The components addressed in this commodity are electrical cables, connectors, splices, terminal blocks, and fuse blocks. Cables are identified on a plant-wide basis, and are not identified as being associated with a particular system. Cables and their associated connectors perform the function of providing electrical continuity to specified sections of an electrical circuit to deliver voltage, current and signals to various equipment and components throughout the plant to enable them to perform their intended functions.

USAR Reference(s)

More information about Cables and Connectors can be found in NMP1 USAR Section IX.B.3 and NMP2 USAR Section 8.3.1.1.4.

License Renewal Drawings

None

Components Subject to an AMR

The component types requiring an AMR for the Cables and Connectors and their intended functions are shown in Table 2.5.C.1-1. The AMR results for these component types are provided in Table 3.6.2.C-1.

Table 2.5.C.1-1
Cables and Connectors

Component Type	Intended Functions
Cables	Electrical Continuity
Connectors	Electrical Continuity
Inaccessible Medium-voltage Cables	Electrical Continuity
Splices	Electrical Continuity
Fuse Blocks	Electrical Continuity
Terminal Blocks	Electrical Continuity

2.5.C.2 NON-SEGREGATED/SWITCHYARD BUS

Description

The components evaluated in this commodity encompass the electrical Switchyard and Non-Segregated busses, as well as their associated insulators. Electrical busses perform the function of providing electrical continuity to specified sections of an electrical circuit voltage and current to various equipment and components throughout the plant to enable them to perform their intended functions. The intended function of the insulators is electrical insulation and NSR functional support through separation of busses and conductors from other components and structures.

USAR Reference(s)

More information about Non-Segregated/Switchyard Bus can be found in NMP1 USAR Section IX.B and NMP2 USAR Section 8.3.1.1.2.

License Renewal Drawings

None

Components Subject to an AMR

The component types requiring an AMR for the Non-Segregated/Switchyard Bus and their intended functions are shown in Table 2.5.C.2-1. The AMR results for these component types are provided in Table 3.6.2.C-2.

Table 2.5.C.2-1
Non-Segregated/Switchyard Bus

Component Type	Intended Functions
Insulators	Electrical Insulation NSR Functional Support
Non-Segregated Bus	Electrical Continuity
Switchyard Bus	Electrical Continuity

2.5.C.3 CONTAINMENT ELECTRICAL PENETRATIONS

Description

The components evaluated in this commodity encompass the non-EQ electrical penetrations that form part of the containment pressure boundary. They also provide electrical continuity to specified sections of an electrical circuit to deliver voltage, current and signals across the containment boundary (either continuously or intermittently) to power various equipment and components throughout the plant to enable them to perform their intended functions. An electrical penetration provides an electrical connection between two sections of the Electrical/I&C circuit. The pigtail at each end of the penetration is connected to the field cable in various ways and is included in this evaluation. The connector or connection method is included in the Cables and Connectors Commodity Group (Section 2.5.C.1). The structural steel portion of the primary containment electrical penetrations is evaluated in the NMP1 Primary Containment Structure (Section 2.4.A.1) and the NMP2 Primary Containment Structure (Section 2.4.B.1).

USAR Reference(s)

More information about the Containment Electrical Penetrations can be found in NMP1 USAR Section IX.B.3.2 and NMP2 USAR Section 8.3.1.1.5.

License Renewal Drawings

None

Components Subject to an AMR

The component types requiring an AMR for the Containment Electrical Penetrations and their intended functions are shown in Table 2.5.C.3-1. The AMR results for these component types are provided in Table 3.6.2.C-3.

Table 2.5.C.3-1
Containment Electrical Penetrations

Component Type	Intended Functions
Electrical Penetrations	Electrical Continuity Pressure Boundary

2.5.C.4 SWITCHYARD COMPONENTS

Description

The Switchyard components commodity was developed to address the addition of the 115KV switchyards for SBO recovery to the scope of license renewal. The components subject to AMR within the yard are the transmission conductors and the insulators associated with them. Cables, connectors, and busbars are evaluated in their respective commodity groups. Switchyard transmission conductors perform the function of providing electrical connections to specified sections of an electrical circuit to deliver voltage, current and signals to various equipment and components throughout the switchyard to enable them to perform their intended functions. The intended function of the high-voltage insulators is electrical insulation and NSR functional support through separation of the busses and conductors from other components and structures.

USAR Reference(s)

More information about Switchyard Components can be found in NMP1 USAR Section IX.B and NMP2 USAR Section 8.2.

License Renewal Drawings

None

Components Subject to an AMR

The component types requiring an AMR for the Switchyard Components and their intended functions are shown in Table 2.5.C.4-1. The AMR results for these component types are provided in Table 3.6.2.C-4.

Table 2.5.C.4-1
Switchyard Components

Component Type	Intended Functions
High Voltage Insulators	Electrical Insulation NSR Functional Support
Transmission Conductors	Electrical Continuity

3.0 AGING MANAGEMENT REVIEW RESULTS

This section provides the results of the aging management reviews for those components and structures identified in Section 2.0 as being subject to an Aging Management Review (AMR). Descriptions of the internal and external service environments that were used in the aging management review to determine aging effects requiring management are included in Table 3.0-1, Environments. Descriptions of the aging effects requiring management are included in Table 3.0-2, Aging Effects Requiring Management. The AMR results information in Section 3 is presented in the following two tables:

- **Table 3.x.1.A (or B)** - where '3' indicates the License Renewal Application (LRA) section number, 'x' indicates the subsection number from NUREG-1801, Volume 1, '1' indicates that this is the first table type in Section 3.x, and '**A**' or '**B**' indicates that this table applies to NMP1 or NMP2, respectively. For example, in the NMP1 Reactor Coolant System subsection, this table would be numbered 3.1.1.A. In the NMP2 Engineered Safety Features subsection, this table would be 3.2.1.B, and so on. For ease of discussion, this table will hereafter be referred to in this Section as "Table 1."

- **Table 3.x.2.A (or B)-y** - where '3' indicates the LRA section number, '**x**' indicates the subsection number from NUREG-1801, Volume 1, '**2**' indicates that this is the second table type in Section 3.x, '**A**' or '**B**' indicates that this table applies to NMP1 or NMP2, respectively, and 'y' indicates the system table number. For example, for the NMP1 Reactor Vessel, within the Reactor Coolant System subsection, this table would be 3.1.2.A-1 and for the NMP2 Reactor Vessel Internals, it would be 3.1.2.B-2. For the NMP1 Containment Spray System, within the Engineered Safety Features subsection, this table would be 3.2.2.A-1. For ease of discussion, this table will hereafter be referred to in this section as "Table 2."

<u>TABLE DESCRIPTION</u>

NUREG-1801, *Generic Aging Lessons Learned (GALL) Report*, contains the NRC staff's generic evaluation of the 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 period of extended 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. In order to take full advantage of NUREG-1801, a comparison between the AMR results and the tables of

NUREG-1801 has been made. The results of that comparison are provided in Tables 1 and 2.

Table 1

The purpose of Table 1 is to provide a summary comparison to 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 "Type" column has been replaced by an "Item Number" column and the "Item Number in GALL" column has 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 is used to provide clarifying/amplifying information. The following are examples of information contained within this column:

- "Further Evaluation Recommended" information or reference to where that information is located (including a hyperlink if possible to other sections of the LRA such as Section 4 or Appendix B).
- The name of the plant specific program being used (and a hyperlink to the program, if applicable).
- Exceptions to the NUREG-1801 assumptions.
- A discussion of how the line item is consistent with the corresponding line item in NUREG-1801, Volume 1, when that may not be intuitively obvious.
- A discussion of how the item is different than the corresponding line item in NUREG-1801, Volume 1, when it may appear to be consistent (e.g., when there is exception taken to an aging management program that is listed in NUREG-1801, Volume 1).

Table 2

Table 2 provides the detailed results of the aging management reviews for those components identified in LRA Section 2 as being subject to aging management review. There will be a Table 2 for each of the subsystems within a "system" grouping.

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

<u>Component Type</u>

The first column identifies all of the component types from Section 2 of the LRA that are subject to aging management review. They are listed in alphabetical order. Some component types that line up with NUREG-1801 are specific to external environments. For example, NUREG-1801 item number V.E.1-a applies to external surfaces of carbon steel components. Thus, the component type that lines up with this NUREG-1801 item would be in an external environment.

<u>Intended Function</u>

The second column contains the license renewal intended functions (including abbreviations where applicable) for the listed component types. Definitions and abbreviations of intended functions are contained in Table 2.0-1.

<u>Material</u>

The third column lists the particular materials of construction for the component type.

Environment

The fourth column lists the environment to which the component types are exposed. The descriptions of the environments used in this column are contained in Table 3.0-1.

Aging Effect Requiring Management

As part of the aging management review process, aging effects requiring management are determined 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. The descriptions of the aging effects requiring management used in this column are contained in Table 3.0-2.

Aging Management Program

The aging management program(s) used to manage the aging effects requiring management is listed in column six.

NUREG-1801 Volume 2 Item

Each combination of component type, material, environment, aging effect requiring management, and aging management program 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. If there is no corresponding item number in NUREG-1801, Volume 2, column seven is left blank.

Table 1 Item

Each combination of component, material, environment, aging effect requiring management, and aging management program that has an identified NUREG-1801 Volume 2 item number must also have a Table 3.x.1 line item reference number. The corresponding line item from Table 1 is listed in column eight. That way, the information from the two tables can be correlated. If there is no corresponding item in NUREG-1801, Volume 1, column eight is left blank.

Notes

Notes are used to identify how the information in Table 2 aligns with the information in NUREG-1801, Volume 2. Notes with letters “A” through “J” are standard industry notes. Notes with the letters “K” through “Q” provide further information for comparison with NUREG-1801, Volume 2 for situations not specifically addressed by the standard industry notes. For example, note “K” is used when a component that is addressed in NUREG-1801 has a different material and environment than what is identified in NUREG-1801. Numerical notes contain NMPNS specific information. These notes and their definitions are provided at the end of the Table 2’s. When a component has no aging effect requiring management and no aging management program, then “None” is used in the notes column.

TABLE USAGE

Table 1

The reviewer evaluates each row in Table 1 by moving from left to right across the table. Since the Component, Aging Effect/Mechanism, Aging Management Programs, and Further Evaluation Recommended information is taken directly from NUREG-1801, Volume 1, no further analysis of those columns is required. The information in this table intended to help the reviewer the most is contained within the Discussion column. This column indicates whether or not NMPNS is consistent with the information contained in NUREG-1801, Volume 1. This may be in the form of descriptive information within the Discussion column or the reviewer may be referred to other locations within the LRA for further information (including hyperlinks where applicable).

Table 2

Table 2 contains the AMR information for NMPNS, whether or not it aligns with NUREG-1801. For a given row within the table, the reviewer is able to see the intended function, material, environment, aging effect requiring management, and aging management program combination for a particular component type within a system. In addition, if there is a correlation between the combination in Table 2 and a combination in NUREG-1801, Volume 2, this will be identified by a referenced item number in column seven, NUREG-1801, Volume 2 Item. The reviewer can refer to the item number in NUREG-1801, Volume 2, if desired, to verify the correlation. If the column is blank, then there is no corresponding combination in NUREG-1801, Volume 2. As the reviewer continues across the table from left to right, within a given row, the next column is labeled Table 1 Item. If there is a reference number in this column, the reviewer is able to use that reference number to locate the corresponding row in Table 1, via a hyperlink, and see how the aging management program for this particular combination aligns with NUREG-1801.

Table 2 provides the reviewer with a means to navigate from the components subject to AMR in LRA Section 2 all the way through the evaluation of the programs that will be used to manage the effects of aging of those components.

TABLE 3.0-1
ENVIRONMENTS

ENVIRONMENT	DESCRIPTION	INTERNAL	EXTERNAL
Adverse localized environment caused by heat or radiation	An adverse localized environment is a condition in a limited plant area that is significantly more severe than the specified service conditions for the electrical equipment.		X
Adverse localized environment caused by moisture and voltage stress.	This environment applies to Non-EQ inaccessible medium voltage cables (e.g., in conduit or direct buried) that are exposed to significant moisture simultaneously with significant voltage. Significant moisture is defined as periodic exposures to moisture that last more than a few days (e.g., cables in standing water). Significant voltage is defined as being subject to system voltage more than 25% of the time.		X
Air	Air includes indoor and outdoor, air-conditioned and non air-conditioned atmospheres. Air is assumed to contain some humidity; however, significant amounts of condensation, pooling of water, or alternate wetting and drying do not occur.	X	X
Air with Thermal Fatigue	This environment is applied to components exposed to air, that are also subject to thermal cycles of sufficient magnitude for thermal fatigue to be a concern.		X
Air, Relative Motion Between Components	This environment is identical to Air with the addition of relative motion between components.		X
Air with Vibratory Motion	This environment is specific to the polymer material group. Ductwork with flexible collars between ducts and fans and seals in dampers and doors are subject to vibratory motion that can cause wear of the elastomer.		X
Air, Moisture or Wetting, temperature < 140°F	This environment applies to components having a metal temperature < 140°F that may be wetted or subject to pooling of water.	X	X
Air, Moisture or Wetting, temperature ≥ 140°F	This environment applies to components having a metal temperature ≥ 140°F that may be wetted or subject to pooling of water.	X	X

TABLE 3.0-1
ENVIRONMENTS

ENVIRONMENT	DESCRIPTION	INTERNAL	EXTERNAL
Air, Moisture or Wetting, temperature ≥ 212°F	This environment applies to components having a metal temperature ≥ 212°F that may be wetted or subject to pooling of water and are also subject to thermal cycles of sufficient magnitude for thermal fatigue to be a concern.		X
Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	This environment applies only to pressure retaining bolting (bolts and studs) in fluid systems with temperatures ≥ 212°F. This environment does not assume leakage.		X
Dried Air or Gas	This environment includes the internal environment for systems whose internal fluid is air, nitrogen gas, hydrogen, carbon dioxide, or fluorocarbon refrigerant, and in which the system features in-line driers that essentially remove all moisture.	X	
Demineralized Untreated Water	This environment applies to systems that use demineralized water as a water source, in which the water is not treated with corrosion inhibitors and is not chemically treated to remove or add oxygen.	X	X
Demineralized Untreated Water, Low Flow	This environment is identical to Demineralized Untreated Water, but has a flow rate of ≤ 6 ft/sec.	X	X
Exhaust	This environment applies to components exposed to hot diesel engine exhaust gasses containing moisture and particulates.	X	
Floor Drains	This environment applies to building and system floor drains. Water may flow through the drains periodically during maintenance operations, cleaning, or when system leakage is occurring. Water flowing through floor drain piping may originate as any of the various types of water used in plant systems (treated water, demineralized water, or raw water).	X	
Fuel Oil	This environment consists of diesel fuel oil. The fuel oil is assumed to be contaminated with some water or moisture.	X	
Fuel Oil without Water Contamination	This environment is identical to Fuel Oil with the exception that there is no water or moisture contamination.	X	

TABLE 3.0-1
ENVIRONMENTS

ENVIRONMENT	DESCRIPTION	INTERNAL	EXTERNAL
Hydraulic Fluid	This environment consists of hydraulic fluid, composed of petroleum distillates. The potential for contamination of the fluid by moisture is assumed to be minimal.	X	
Lubricating Oil	This environment consists of oil used for lubrication of major rotating equipment, such as pumps, compressors, or diesel generator engines.	X	
Raw Water	Raw water includes untreated water used in open-cycle cooling systems. The water source is natural water such as well water or lake water.	X	X
Raw Water, Low Flow	This environment is chemically identical to Raw Water, but has a flow rate of ≤ 6 ft/sec.	X	
Soil, above the water table	This is the external environment for components buried in the earth located above the ground water table. Soil is assumed to contain ground water due to drainage of rainwater.		X
Soil, below the water table	This environment applies to components buried in the earth located below the ground water table.		X
Undisturbed Soil	Undisturbed soil is defined as soil that has not been subjected to any excavation and/or subsequent backfill. This soil environment is only applicable to driven structural steel piles.		X
Sodium Pentaborate Solution	The environment consists of treated water containing a sodium pentaborate solution. This environment is found only in the NMP1 Liquid Poison System and the NMP2 Standby Liquid Control System.	X	
Treated Water, temperature < 140°F	Low temperature treated water.[1]	X	X
Treated Water, temperature < 140°F, Low Flow	This environment is identical to Treated Water, temperature < 140°F, except that the flow rate is ≤ 6 ft/sec.	X	

[1] Treated water – basic definition: The water source is demineralized water that is chemically treated to remove oxygen. Corrosion inhibitors can be added to the water. Administrative limits are placed on dissolved oxygen and contaminants, and in some cases suspended solids. The concentration of contaminants is controlled by a combination of filtration, ion exchangers, or feed-and bleed (dilution) operations.

TABLE 3.0-1
ENVIRONMENTS

ENVIRONMENT	DESCRIPTION	INTERNAL	EXTERNAL
Treated Water, temperature < 140°F, Gamma Irradiation	The environment is identical to Treated Water, temperature < 140°F, Low Flow with the addition of gamma irradiation.	X	X
Treated Water, temperature ≥ 140°F, but < 212°F	Low to medium temperature treated water.	X	
Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Identical to Treated Water, temperature ≥ 140°F, but < 212°F, except that the flow rate is ≤ 6 ft/sec.	X	
Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Medium temperature treated water or steam.	X	
Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	This environment is identical to Treated Water or Steam, temperature ≥ 212°F, but < 482°F, with the exception that the normal operating flow rate is ≤ 6 ft/sec.	X	
Treated Water or Steam, temperature ≥ 482°F	High temperature treated water or steam.	X	
Treated Water or Steam, temperature ≥ 482°F, Low Flow	This environment is identical to Treated Water or Steam, temperature ≥ 482°F, except that the flow rate is ≤ 6 ft/sec.	X	
Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	This environment is similar to Treated Water or Steam, Temperature ≥ 482°F, but is applicable only to reactor vessel components that receive neutron fluence less than $1x10^{17}$ n/cm^2.	X	
Treated Water or Steam, High temperature, Neutron Fluence ≥ $1x10^{17}$n/cm^2 – BWR Reactor Pressure Vessel	This environment is similar to Treated Water or Steam, Temperature ≥ 482°F, with the addition of neutron fluence ≥ $1x10^{17}$ n/cm^2. This environment is applicable to reactor pressure vessel components that will receive significant neutron fluence, which will generally be limited to those adjacent to the active core.	X	
Treated Water or Steam, High temperature, Neutron Fluence < $5x10^{20}$ n/cm^2 – BWR Reactor Vessel Internals	The environment is identical to Treated Water or Steam, Temperature ≥ 482°F, with the addition of neutron fluence < $5x10^{20}$ n/cm^2. This environment is applicable only to reactor vessel internal components.	X	
Treated Water or Steam, High temperature, Neutron Fluence ≥ $5x10^{20}$ n/cm^2 – BWR Reactor Vessel Internals	The environment is similar to Treated Water or Steam, Temperature ≥ 482°F, with the addition of neutron fluence ≥ $5x10^{20}$ n/cm^2. This environment is applicable only to higher fluence reactor vessel internal components.	X	

TABLE 3.0-2
AGING EFFECTS REQUIRING MANAGEMENT

AGING EFFECT	DESCRIPTION
Change in Dimensions	An increase or decrease in one or more linear dimensions or an increase or decrease in the volume of a component.
Cracking	The production and growth of sharp discontinuities in a material, which could eventually culminate in fracture or fragmentation of the material.
Cracking/Delamination	A fracturing, flaking, or splitting of a material. Applies only to Firestops.
Hardening and Shrinkage	An increase in hardness accompanied by a reduction in one or more linear dimensions or in volume. Applies only to Polymers.
Loss of Anchor Capacity	The loss of ability for concrete or grout to resist the pulling-out of a steel anchor.
Loss of Electrical Continuity	Failure of electrical connections to maintain an electrical circuit to deliver voltage, current or signals.
Loss of Form	A change in the shape of a component. This aging effect applies particularly to earthen structures that may settle, be undermined, or change in shape due to sedimentation.
Loss of Fracture Toughness	A reduction in the energy required to propagate a fracture through a material. Loss of fracture toughness can be thought of as a reduction in the resistance of a material to the growth of cracks or the propagation of a fracture. The term embrittlement is synonymous with loss of fracture toughness.
Loss of Heat Transfer	A reduction in the capability to transfer heat through a material or component.
Loss of Insulation Resistance	Electrical failure due to embrittlement, cracking, melting, or discoloration leading to reduced insulation resistance; caused by: • thermal/thermoxidative degradation of organic materials, radiolysis and photolysis (UV sensitive materials only); • radiation-induced oxidation; • moisture intrusion (water treeing); or • environmental contamination (high voltage insulators).
Loss of Leak Tightness	Loss of leak tightness is caused by loss of material due to wear. This is applicable to containment hatches and airlocks.
Loss of Material	A generalized loss of material distributed relatively evenly over the surface of a component. Synonyms for loss of material include loss of thickness, loss of section, wall thinning, and weight loss.
Loss of Material Properties	A loss of resistance to flaking or erosion caused by dryout (desiccation) of soil. Applies only to earthen structures.
Loss of Neutron Absorbing Capacity	Washout of boron carbide in the normal spent fuel pool environment causing a loss of neutron absorbing capacity.
Loss of Strength	A reduction in load-bearing capacity of material. Applies only to polymers.
Separation	The loss of adhesion between two different materials. Applies only to firestops.

3.1 AGING MANAGEMENT OF REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEMS

3.1.1 INTRODUCTION

This section provides the results of the aging management review for those components identified in Section 2.3.1, Reactor Vessel, Internals, and Reactor Coolant Systems (RCS), as being subject to aging management review. The systems, or portions of systems, which are addressed in this section, are described in the indicated sections.

NMP1

- NMP1 Reactor Pressure Vessel (2.3.1.A.1)
- NMP1 Reactor Pressure Vessel Internals (2.3.1.A.2)
- NMP1 Reactor Pressure Vessel Instrumentation System (2.3.1.A.3)
- NMP1 Reactor Recirculation System (2.3.1.A.4)
- NMP1 Control Rod Drive System (2.3.1.A.5)

NMP2

- NMP2 Reactor Pressure Vessel (2.3.1.B.1)
- NMP2 Reactor Pressure Vessel Internals (2.3.1.B.2)
- NMP2 Reactor Pressure Vessel Instrumentation System (2.3.1.B.3)
- NMP2 Reactor Recirculation System (2.3.1.B.4)
- NMP2 Control Rod Drive System (2.3.1.B.5)

Tables 3.1.1.A, NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801, and 3.1.1.B, NMP2 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801, provide the summary of the programs evaluated in NUREG-1801 for the RCS component groups that are relied on for license renewal.

These tables use the format described in Section 3.0 above. Note that these tables only include results for those component groups that are applicable to a BWR.

3.1.2 RESULTS

The following tables summarize the results of the aging management review for systems in the RCS group.

NMP1

- Table 3.1.2.A-1 Reactor Vessel, Internals, and Reactor Coolant System - NMP1 Reactor Pressure Vessel – Summary of Aging Management Evaluation
- Table 3.1.2.A-2 Reactor Vessel, Internals, and Reactor Coolant System - NMP1 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation
- Table 3.1.2.A-3 Reactor Vessel, Internals, and Reactor Coolant System - NMP1 Reactor Pressure Vessel Instrumentation System – Summary of Aging Management Evaluation
- Table 3.1.2.A-4 Reactor Vessel, Internals, and Reactor Coolant System - NMP1 Reactor Recirculation System – Summary of Aging Management Evaluation
- Table 3.1.2.A-5 Reactor Vessel, Internals, and Reactor Coolant System - NMP1 Control Rod Drive System – Summary of Aging Management Evaluation

NMP2

- Table 3.1.2.B-1 Reactor Vessel, Internals, and Reactor Coolant System - NMP2 Reactor Pressure Vessel – Summary of Aging Management Evaluation
- Table 3.1.2.B-2 Reactor Vessel, Internals, and Reactor Coolant System - NMP2 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation
- Table 3.1.2.B-3 Reactor Vessel, Internals, and Reactor Coolant System - NMP2 Reactor Pressure Vessel Instrumentation System – Summary of Aging Management Evaluation

- Table 3.1.2.B-4 Reactor Vessel, Internals, and Reactor Coolant System - NMP2 Reactor Recirculation System – Summary of Aging Management Evaluation

- Table 3.1.2.B-5 Reactor Vessel, Internals, and Reactor Coolant System - NMP2 Control Rod Drive System – Summary of Aging Management Evaluation

The materials from which specific components are fabricated, the environments to which components are exposed, the 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 3.1.2.A, NMP1 Materials, Environments, Aging Effects Requiring Management and Aging Management Programs and Section 3.1.2.B, NMP2 Materials, Environments, Aging Effects Requiring Management and Aging Management Programs:

NMP1

- Section 3.1.2.A.1, NMP1 Reactor Pressure Vessel

- Section 3.1.2.A.2, NMP1 Reactor Pressure Vessel Internals

- Section 3.1.2.A.3, NMP1 Reactor Pressure Vessel Instrumentation System

- Section 3.1.2.A.4, NMP1 Reactor Recirculation System

- Section 3.1.2.A.5, NMP1 Control Rod Drive System

NMP2

- Section 3.1.2.B.1, NMP2 Reactor Pressure Vessel

- Section 3.1.2.B.2, NMP2 Reactor Pressure Vessel Internals

- Section 3.1.2.B.3, NMP2 Reactor Pressure Vessel Instrumentation System

- Section 3.1.2.B.4, NMP2 Reactor Recirculation System

- Section 3.1.2.B.5, NMP2 Control Rod Drive System

3.1.2.A NMP1 MATERIALS, ENVIRONMENTS, AGING EFFECTS REQUIRING MANAGEMENT AND AGING MANAGEMENT PROGRAMS

3.1.2.A.1 NMP1 REACTOR PRESSURE VESSEL

Materials

The materials of construction for the NMP1 Reactor Pressure Vessel components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Nickel Based Alloys
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Reactor Pressure Vessel components are exposed to the following environments:

- Air, Moisture or Wetting, temperature <140°F
- Air, Moisture or Wetting, Temperature ≥ 212°F
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F
- Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel
- Treated Water or Steam, High temperature, Neutron Fluence ≥ $1x10^{17} n/cm^2$. - BWR Reactor Pressure Vessel
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Reactor Pressure Vessel, require management:

- Cracking
- Loss of Fracture Toughness
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Reactor Pressure Vessel components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- BWR Feedwater Nozzle Program
- BWR Penetrations Program
- BWR Stress Corrosion Cracking Program
- BWR Vessel ID Attachment Welds Program
- BWR Vessel Internals Program
- Fatigue Monitoring Program
- One-Time Inspection Program
- Reactor Head Closure Studs Program
- Reactor Vessel Surveillance Program
- Water Chemistry Control Program

3.1.2.A.2 NMP1 REACTOR PRESSURE VESSEL INTERNALS

Materials

The materials of construction for the NMP1 Reactor Pressure Vessel Internals components are:

- Cast Austenitic Stainless Steel
- Nickel Based Alloys
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Reactor Pressure Vessel Internals components are exposed to the following environments:

- Treated Water or Steam, temperature ≥ 482°F
- Treated Water or Steam, High temperature, Neutron Fluence $< 5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals
- Treated Water or Steam, High temperature, Neutron Fluence $\geq 5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals

Aging Effect Requiring Management

The following aging effect, associated with the NMP1 Reactor Pressure Vessel Internals, requires management:

- Cracking

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Reactor Pressure Vessel Internals components:

- BWR Vessel Internals Program
- Fatigue Monitoring Program
- Water Chemistry Control Program

3.1.2.A.3 NMP1 REACTOR PRESSURE VESSEL INSTRUMENTATION SYSTEM

Materials

The materials of construction for the NMP1 Reactor Pressure Vessel Instrumentation System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel(Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Reactor Pressure Vessel Instrumentation System components are exposed to the following environments:

- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F
- Treated Water, temperature < 140°F, Low Flow
- Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Reactor Pressure Vessel Instrumentation System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Reactor Pressure Vessel Instrumentation System components:

- ASME Section XI, Subsections IWB, IWC, & IWD, Inservice Inspection Program
- Fatigue Monitoring Program
- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Program

3.1.2.A.4 NMP1 REACTOR RECIRCULATION SYSTEM

Materials

The materials of construction for the NMP1 Reactor Recirculation System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Reactor Recirculation System components are exposed to the following environments:

- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F
- Treated Water, temperature < 140°F, Low Flow

- Treated Water or Steam, temperature > 482°F
- Treated Water or Steam, temperature > 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Reactor Recirculation System, require management:

- Cracking
- Loss of Fracture Toughness
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Reactor Recirculation System components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- BWR Stress Corrosion Cracking Program
- Fatigue Monitoring Program
- One-Time Inspection Program
- Water Chemistry Control Program

3.1.2.A.5 NMP1 CONTROL ROD DRIVE SYSTEM

Materials

The materials of construction for the NMP1 Control Rod Drive System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Cast Austenitic Stainless Steel
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Control Rod Drive System components are exposed to the following environments:

- Dried Air or Gas
- Treated Water, temperature ≥ 140°F, but < 212°F
- Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Control Rod Drive System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Control Rod Drive System components:

- ASME Section XI, Subsections IWB, IWC, & IWD, Inservice Inspection Program
- One-Time Inspection Program
- Selective Leaching of Materials Program
- Systems Walkdown Program
- Water Chemistry Program

3.1.2.B NMP2 MATERIALS, ENVIRONMENTS, AGING EFFECTS REQUIRING MANAGEMENT AND AGING MANAGEMENT PROGRAMS

3.1.2.B.1 NMP2 REACTOR PRESSURE VESSEL

Materials

The materials of construction for the NMP2 Reactor Pressure Vessel components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Nickel Based Alloys
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Reactor Pressure Vessel components are exposed to the following environments:

- Air With Thermal Fatigue
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F
- Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel
- Treated Water or Steam, High temperature, Neutron Fluence ≥ $1x10^{17}n/cm^2$. – BWR Reactor Pressure Vessel

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Reactor Pressure Vessel, require management:

- Cracking
- Loss of Fracture Toughness
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Reactor Pressure Vessel components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- BWR Penetrations Program
- BWR Vessel ID Attachment Welds Program
- Fatigue Monitoring Program
- Reactor Head Closure Studs Program
- Reactor Vessel Surveillance Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.1.2.B.2 NMP2 REACTOR PRESSURE VESSEL INTERNALS

Materials

The materials of construction for the NMP2 Reactor Pressure Vessel Internals components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Nickel Based Alloys
- Wrought Austenitic Stainless Steel

Environment

The NMP2 Reactor Pressure Vessel Internals components are exposed to the following environment:

- Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel
- Treated Water or Steam, High temperature, Neutron Fluence $\geq 1x10^{17}n/cm^2$. – BWR Reactor Pressure Vessel
- Treated Water or Steam, High temperature, Neutron Fluence $< 5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals
- Treated Water or Steam, High temperature, Neutron Fluence $\geq 5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals
- Treated Water or Steam, temperature ≥ 482°F

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Reactor Pressure Vessel Internals, requires management:

- Cracking

Aging Management Programs

The following aging management programs manage the aging effect for the NMP2 Reactor Pressure Vessel Internals components:

- BWR Vessel Internals Program
- Fatigue Monitoring Program
- Water Chemistry Control Program

3.1.2.B.3 NMP2 REACTOR PRESSURE VESSEL INSTRUMENTATION SYSTEM

Materials

The materials of construction for the NMP2 Reactor Pressure Vessel Instrumentation System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels
- Nickel Based Alloys
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Reactor Pressure Vessel Instrumentation System components are exposed to the following environments:

- Air
- Air, Moisture or Wetting, temperature ≥ 140°F
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F
- Treated Water, temperature < 140°F, Low Flow
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Reactor Pressure Vessel Instrumentation System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Reactor Pressure Vessel Instrumentation System components:

- ASME Section XI, Subsections IWB, IWC, & IWD, Inservice Inspection Program
- Fatigue Monitoring Program
- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Program

3.1.2.B.4 NMP2 REACTOR RECIRCULATION SYSTEM

Materials

The materials of construction for the NMP2 Reactor Recirculation System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Nickel Based Alloys
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Reactor Recirculation System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F
- Hydraulic Fluid
- Treated Water, temperature < 140°F, Low Flow
- Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow
- Treated Water or Steam, temperature ≥ 482°F
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Reactor Recirculation System, require management:

- Cracking
- Loss of Fracture Toughness
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Reactor Recirculation System components:

- ASME Section XI, Subsections IWB, IWC, & IWD, Inservice Inspection Program
- Fatigue Monitoring Program
- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Program

3.1.2.B.5 NMP2 CONTROL ROD DRIVE SYSTEM

Materials

The materials of construction for the NMP2 Control Rod Drive System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Cast Austenitic Stainless Steel
- Copper Alloys (Zinc ≤ 15%)
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Control Rod Drive System components are exposed to the following environments:

- Air
- Dried Air or Gas
- Treated Water, temperature < 140°F, Low Flow
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Control Rod Drive System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Control Rod Drive System components:

- ASME Section XI, Subsections IWB, IWC, & IWD, Inservice Inspection Program
- Fatigue Monitoring Program
- One-Time Inspection Program
- Water Chemistry Program

3.1.3 TIME-LIMITED AGING ANALYSES

The Time-Limited Aging Analyses (TLAAs) identified below are associated with the RCS 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 Analysis (Section 4.3)
- NMP2 Core Plate Holdown Bolts (Section 4.7.3)
- NMP1 Reactor Vessel Weld Flaw Evaluation (Section 4.7.4)

3.1.4 CONCLUSIONS

The RCS components that are subject to aging management review have been identified in accordance with the requirements of 10 CFR 54.4. The aging management programs selected to manage aging effects for the RCS components are identified in the summary tables and Section 3.1.2. A description of these aging management programs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation. Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the RCS 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.A NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.A-01	Reactor coolant pressure boundary components	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Consistent with NUREG-1801. The TLAA is further evaluated in Section 4.3. Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Condensing pots • Control Rod Drive (CRD) Assemblies • Core Shroud support plates, rings, and welds • Core Shroud head bolts and collars • Core Spray nozzles, Emergency Condenser Steam outlet nozzles and Reactor Recirculation nozzles • Feedwater nozzle thermal sleeves • Flow elements • Instrumentation Penetrations • Orifices in the NMP1 Shutdown Cooling System (see Table 3.3.2.A-20) (continued on next page)

Table 3.1.1.A NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.A-01 (cont'd)	Reactor coolant pressure boundary components	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Reactor Vessel flange leak detection lines • Steam Dryers • Steam, Core Differential Pressure, Core Spray, Emergency Condenser Steam Feedwater, Reactor Recirculation, and Safety Valve nozzle safe ends • Temperature Equalizing Columns • Top Head Enclosure with cladding and leak detection lines • Top Head Nozzles • Vessel Drain Penetrations • Vessel Welds For the NMP1 Control Rod Drive Return Line (CRDRL) nozzles, NMP1 credits the ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program (Appendix B2.1.1) in lieu of the Fatigue Monitoring Program because the CRDRL nozzle thermal sleeve design at NMP1 makes the nozzle less susceptible to thermal fatigue cracking than the original designs at other BWR's.

Table 3.1.1.A NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.A-01 (cont'd)	Reactor coolant pressure boundary components	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Additionally, for the NMP1 Feedwater nozzles, NMP1 credits the BWR Feedwater Nozzle Program (Appendix B2.1.5) in addition to the Fatigue Monitoring Program because an enhanced Inservice Inspection program for the feedwater nozzles as required by NUREG-0619 was implemented at NMP1. The BWR Feedwater Nozzle Program activities are based upon enhanced Inservice Inspections in accordance with the requirements of the ASME Boiler and Pressure Vessel Code Section XI, 1989 Edition with no Addenda, Section XI, Subsection IWB.
3.1.1.A-02	PWR only				
3.1.1.A-03	Isolation Condenser	Loss of material due to general, pitting, and crevice corrosion	Inservice inspection; water chemistry	Yes, plant specific	Not applicable, because the components of the NMP1 Isolation Condenser that have this aging effect/mechanism are exposed to a different environment (air). See row 3.1.1.A-09 for further evaluation.
3.1.1.A-04	Pressure vessel ferritic materials that have a neutron fluence greater than 10^{17} n/cm2 (E>1MeV)	Loss of fracture toughness due to neutron irradiation embrittlement	TLAA, evaluated in accordance with Appendix G of 10CFR50 and RG 1.99	Yes, TLAA	The only RCS components with this environment and aging effect are the Reactor Vessel beltline shell and welds which are addressed in row 3.1.1.A-05. The TLAA is further evaluated in Section 4.2.

Table 3.1.1.A NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.A-05	Reactor vessel beltline shell and welds	Loss of fracture toughness due to neutron irradiation embrittlement	Reactor vessel surveillance	Yes, plant specific	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.19). Further evaluation is documented in Section 4.2 and B2.1.19 (Reactor Vessel Surveillance Program).
3.1.1.A-06	PWR only				

Table 3.1.1.A NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.A-07	Small-bore reactor coolant system and connected systems piping	Crack initiation and growth due to stress corrosion cracking (SCC), intergranular stress corrosion cracking (IGSCC), and thermal and mechanical loading	Inservice inspection; water chemistry; one-time inspection	Yes, parameters monitored/ inspected and detection of aging effects are to be further evaluated	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.1 and B2.1.2). Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Accumulators • Condensing Pots • CRD System filters • Reactor Vessel Instrumentation Valves • Small bore valves • Temperature Equalizing Columns A plant-specific destructive examination or a nondestructive examination (NDE) that permits inspection of the inside surfaces of the piping is to be conducted. This will be performed as part of a one-time inspection that will be conducted to verify that service-induced weld cracking is not occurring in the small-bore piping. Additionally, for small bore piping and fittings in the NMP1 CRD System that are not part of the Inservice Inspection Testing Program, NMP1 only credits the Water Chemistry and One-Time Inspection Programs.

Table 3.1.1.A NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.A-08	Jet pump sensing line and reactor vessel flange leak detection line	Crack initiation and growth due to SCC, IGSCC, or cyclic loading	Plant specific	Yes, plant specific	Consistent with NUREG-1801 except that jet pump sensing lines do not exist at NMP1. Additionally, leak detection lines with an aging effect/mechanism of crack initiation and growth due to fatigue are also evaluated in row 3.1.1.A-01. Further evaluation is provided in Appendix B2.1.1 (ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program), B2.1.2 (Water Chemistry Control Program), and B2.1.20 (One-Time Inspection Program).
3.1.1.A-09	Isolation Condenser	Crack initiation and growth due to SCC or cyclic loading	Inservice inspection; water chemistry	Yes, plant specific	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.1 and B2.1.2). Additonally, NMP1 credits the Preventive Maintenance (PM) Program (Section B2.1.32) in lieu of the ASME Section XI, Subsections IWB, IWC, & IWD, Inservice Inspection Program for the NMP1 Emergency Condenser (see Table 3.2.2.A-3). This component is currently part of the PM program which adequately manages the effects of aging. Further evaluation is documented in Appendix B2.1.2 (Water Chemistry Control Program) and B2.1.32 (Preventive Maintenance Program).
3.1.1.A-10	PWR only				
3.1.1.A-11	PWR only				

Table 3.1.1.A NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.A-12	PWR only				
3.1.1.A-13	PWR only				
3.1.1.A-14	PWR only				
3.1.1.A-15	PWR only				
3.1.1.A-16	PWR only				
3.1.1.A-17	PWR only				
3.1.1.A-18	PWR only				
3.1.1.A-19	PWR only				
3.1.1.A-20	PWR only				
3.1.1.A-21	PWR only				

Table 3.1.1.A NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.A-22	Reactor vessel closure studs and stud assembly	Crack initiation and growth due to SCC and/or IGSCC	Reactor head closure studs	No	Not applicable for the Closure Head Studs and Nuts since the environment causing the aging effect/mechanism is not applicable to NMP1. The environment in the applicable NUREG-1801 Volume 2 item (IV.A1.1-c) assumes leaking reactor coolant water and/or steam. NMP1 operating experience has not demonstrated any leaking in the Reactor Vessel closure studs. Nonetheless, NMP1 credits the Fatigue Monitoring Program (Section B3.2) for Closure Head Studs and Nuts that have an aging effect/mechanism of crack initiation and growth due to fatigue, and the Reactor Head Closure Studs Program (Section B2.1.3) for Closure Head Studs and Nuts that have an aging effect/mechanism of loss of material due to general corrosion. Not applicable for the Closure Head Stud Assembly since a borated water environment is not present in a BWR.
3.1.1.A-23	CASS pump casing and valve body pump casing and valve body	Loss of fracture toughness due to thermal aging embrittlement	Inservice inspection	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.1).
3.1.1.A-24	CASS piping	Loss of fracture toughness due to thermal aging embrittlement	Thermal aging embrittlement of Cast Austenitic Stainless Steel	No	Not applicable because this component does not exist at NMP1.

Table 3.1.1.A NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.A-25	BWR piping and fittings; steam generator components	Wall thinning due to flow accelerated corrosion	Flow accelerated corrosion	No	Consistent with NUREG-1801 for valves with this aging effect/mechanism that are part of the Reactor Coolant Pressure Boundary (Note: NUREG-1801 Volume 2 Item IV.C1.3-a, which applies to this row number, addresses valves). Additionally, NMP1 Main Steam flow elements, which are part of the NMP1 Reactor Coolant Pressure Boundary, are consistent with, but not addressed in, NUREG-1801. Not applicable for the NMP1 RCS piping and fittings because they are either evaluated in rows 3.1.1.A-01, 3.1.1.A-07, 3.1.1.A-29, and 3.1.1.A-31 or they have a different aging effect/mechanism. Not applicable for steam generator components because NMPNS does not have steam generators.

Table 3.1.1.A NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.A-26	Reactor coolant pressure boundary (RCPB) valve closure bolting, manway and holding bolting, and closure bolting in high- pressure and high-temperature systems	Loss of material due to wear; loss of preload due to stress relaxation; crack initiation and growth due to cyclic loading and/or SCC	Bolting integrity	No	Consistent with NUREG-1801, with the following exceptions: • NMP1 credits the ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program (ISI Program) in lieu of the Bolting Integrity Program to manage the aging effect of loss of material in a high-pressure and high-temperature environment. As noted in Appendix B2.1.1, the ISI Program manages aging of pressure-retaining components including bolting. • Bolting that has an aging effect/mechanism of crack initiation and growth due to fatigue is evaluated in row 3.1.1.A-01. • The aging effect/mechanism of loss of preload due to stress relaxation is not an aging effect/mechanism at NMP1 for this environment. • Not applicable for the CRD penetration flange bolting, manway bolting, and closure bolting since a borated water environment is not present in a BWR. • Not applicable for the pressurizer bolting because this component does not exist at NMP1.
3.1.1.A-27	Feedwater and control rod drive (CRD) return line nozzles	Crack initiation and growth due to cyclic loading	Feedwater nozzle; CRD return line nozzle	No	The AERM is not applicable because crack initiation and growth due to cyclic loading (other than fatigue, row 3.1.1.A-01) does not exist at NMP1.

Table 3.1.1.A NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.A-28	Vessel shell attachment welds	Crack initiation and growth due to SCC and/or IGSCC	BWR vessel ID attachment welds; water chemistry	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2). In addition to the BWR Vessel ID Attachment Welds Program and the Water Chemistry Control Program, NMP1 also credits the BWR Vessel Internals Program (Section B2.1.8) for the Reactor Vessel Shell nickel-based alloy attachment welds. These programs adequately manage the aging effects for these components.
3.1.1.A-29	Nozzle safe ends, recirculation pump casing, connected systems piping and fittings, body and bonnet of valves	Crack initiation and growth due to SCC and/or IGSCC	BWR stress corrosion cracking; water chemistry	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.6 and B2.1.2). Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Emergency Condenser Steam nozzle safe ends • Flow elements • Instrumentation penetrations NMP1 credits the One-Time Inspection Program (Appendix B2.1.20) in lieu of the BWR SCC program for valves in the NMP1 Control Rod Drive System and Main Steam System (see Table 3.4.2.A-4). (continued on next page)

Table 3.1.1.A NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.A-29 (cont'd)	Nozzle safe ends, recirculation pump casing, connected systems piping and fittings, body and bonnet of valves	Crack initiation and growth due to SCC and/or IGSCC	BWR stress corrosion cracking; water chemistry	No	Additionally, NMP1 credits the ISI Program (Appendix B2.1.1) in lieu of the BWR Stress Corrosion Cracking (SCC) Program for: • Piping in the NMP1 Emergency Cooling System (see Table 3.2.2.A-3) • Valves in the Reactor Recirculation System, Reactor Water Cleanup System (see Table 3.3.2.A-17), and the Shutdown Cooling System (see Table 3.3.2.A-20). These components are currently part of the ISI program. As noted in Appendix B2.1.6, the BWR SCC program credits activities performed under the direction of the ISI Program. Thus, the ISI program is adequate for managing the aging effects for these components.
3.1.1.A-30	Penetrations	Crack initiation and growth due to SCC, IGSCC, and/or cyclic loading	BWR bottom head penetrations; water chemistry	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2).

Table 3.1.1.A NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.A-31	Core shroud and core plate, support structure, top guide, core spray lines and spargers, jet pump assemblies, control rod drive housing, and nuclear instrumentation guide tubes	Crack initiation and growth due to SCC, IGSCC, and/or IASCC	BWR vessel internals; water chemistry	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2). Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Control Rod Guide tubes • Core Shroud clamps, spacers, support rings, and tie rods • Core Shroud head bolts and collars • Steam Dryers
3.1.1.A-32	Core shroud and core plate access hole cover (welded and mechanical covers)	Crack initiation and growth due to SCC, IGSCC, and/or IASCC	ASME Section XI inservice inspection; water chemistry	No	The core shroud and supporting components that have this aging effect/mechanism are evaluated in row 3.1.1.A-31 since NMP1 credits the BWR Vessel Internals Program (Section B2.1.8) and Water Chemistry Control Program (Section B2.1.2) for managing the aging effects for these components. Not applicable for the core plate access hole cover since this component does not exist at NMP1. Additionally, the NMP1 Feedwater Sparger thermal sleeves are consistent with, but not addressed in, NUREG-1801.

Table 3.1.1.A NMP1 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.A-33	Jet pump assembly castings and orificed fuel support	Loss of fracture toughness due to thermal aging and neutron irradiation embrittlement	Thermal aging and neutron irradiation embrittlement	No	Not applicable because this component does not exist at NMP1.
3.1.1.A-34	Unclad top head and nozzles	Loss of material due to general, pitting, and crevice corrosion	Inservice inspection; water chemistry	No	Not applicable because NMP1 has a cladded top head enclosure and nozzles. The NMP1 top head and nozzles are evaluated in row 3.1.1.A-01.
3.1.1.A-35	PWR only				
3.1.1.A-36	PWR only				
3.1.1.A-37	PWR only				
3.1.1.A-38	PWR only				
3.1.1.A-39	PWR only				
3.1.1.A-40	PWR only				
3.1.1.A-41	PWR only				
3.1.1.A-42	PWR only				
3.1.1.A-43	PWR only				
3.1.1.A-44	PWR only				
3.1.1.A-45	PWR only				
3.1.1.A-46	PWR only				
3.1.1.A-47	PWR only				
3.1.1.A-48	PWR only				

Table 3.1.1.B NMP2 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.B-01	Reactor coolant pressure boundary components	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Consistent with NUREG-1801. The TLAA is further evaluated in Section 4.3. Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Core Spray, Drain, Jet Pump Instrumentation, Reactor Recirculation, Residual Heat Removal , spray nozzles, Top Head, and vent nozzles • Core Spray, CRD Return Line, Feedwater, Steam, Jet Pump Instrumentation, Residual Heat Removal, and Reactor Recirculation nozzle safe ends • Core Spray, CRD Return Line, Feedwater, Residual Heat Removal, and Reactor Recirculation nozzle thermal sleeves • CRD housings • Drain line penetrations • Head bolts • Instrumentation penetrations • Leak detection lines (continued on next page)

Table 3.1.1.B NMP2 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.B-01 (cont'd)	Reactor coolant pressure boundary components	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	The following components are consistent with, but not addressed in, NUREG-1801: • Main Steam flow elements, condensing chambers, and restriction orifices (see Table 3.4.2.B-3) • Steam Dryers • Stub tube welds • Top Head Enclosure without cladding • Vessel welds
3.1.1.B-02	PWR only				
3.1.1.B-03	Isolation Condenser	Loss of material due to general, pitting, and crevice corrosion	Inservice inspection; water chemistry	Yes, plant specific	Not applicable because this component does not exist at NMP2.
3.1.1.B-04	Pressure vessel ferritic materials that have a neutron fluence greater than 10^{17} n/cm2 (E>1MeV)	Loss of fracture toughness due to neutron irradiation embrittlement	TLAA, evaluated in accordance with Appendix G of 10CFR50 and RG 1.99	Yes, TLAA	The only RCS components with this environment and aging effect are the Reactor Vessel beltline shell and welds which are addressed in row 3.1.1.B-05. The TLAA is further evaluated in Section 4.2.
3.1.1.B-05	Reactor vessel beltline shell and welds	Loss of fracture toughness due to neutron irradiation embrittlement	Reactor vessel surveillance	Yes, plant specific	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.19). Further evaluation is documented in Section 4.2 and Section B2.1.19 (Reactor Vessel Surveillance Program).
3.1.1.B-06	PWR only				

Table 3.1.1.B NMP2 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.B-07	Small-bore reactor coolant system and connected systems piping	Crack initiation and growth due to stress corrosion cracking (SCC), intergranular stress corrosion cracking (IGSCC), and thermal and mechanical loading	Inservice inspection; water chemistry; one-time inspection	Yes, parameters monitored/ inspected and detection of aging effects are to be further evaluated	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.1 and B2.1.2). Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Accumulators • Condensing chambers • Control Rod Hydraulic Control Units • Flow elements in the Reactor Water Cleanup System (see Table 3.3.2.B-24) • Restriction orifices • Valves A plant-specific destructive examination or a nondestructive examination (NDE) that permits inspection of the inside surfaces of the piping is to be conducted. This will be performed as part of a one-time inspection that will be conducted to verify that service-induced weld cracking is not occurring in the small-bore piping. Additionally, for small bore piping and fittings in the NMP2 CRD System that are not part of the Inservice Inspection Testing Program, NMP2 only credits the Water Chemistry and One-Time Inspection Programs.

Table 3.1.1.B NMP2 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.B-08	Jet pump sensing line and reactor vessel flange leak detection line	Crack initiation and growth due to SCC, IGSCC, or cyclic loading	Plant specific	Yes, plant specific	Not applicable for the jet pump sensing lines because this component is not in scope for license renewal. Not applicable for leak detections lines because they are made of carbon steel whereas NUREG-1801 item IV.A1.4-b lists stainless steel. The leak detection lines are evaluated in row 3.1.1.B-01.
3.1.1.B-09	Isolation Condenser	Crack initiation and growth due to SCC or cyclic loading	Inservice inspection; water chemistry	Yes, plant specific	Not applicable because this component does not exist at NMP2.
3.1.1.B-10	PWR only				
3.1.1.B-11	PWR only				
3.1.1.B-12	PWR only				
3.1.1.B-13	PWR only				
3.1.1.B-14	PWR only				
3.1.1.B-15	PWR only				
3.1.1.B-16	PWR only				
3.1.1.B-17	PWR only				
3.1.1.B-18	PWR only				
3.1.1.B-19	PWR only				
3.1.1.B-20	PWR only				
3.1.1.B-21	PWR only				

Table 3.1.1.B NMP2 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.B-22	Reactor vessel closure studs and stud assembly	Crack initiation and growth due to SCC and/or IGSCC	Reactor head closure studs	No	Not applicable for the Closure Head Studs and Nuts since the environment causing the aging effect/mechanism is not applicable to NMP2. The environment in the applicable NUREG-1801 Volume 2 item (IV.A1.1-c) assumes leaking reactor coolant water and/or steam. NMP2 operating experience has not demonstrated any leaking in the Reactor Vessel closure studs. Nonetheless, NMP2 credits the Fatigue Monitoring Program (Section B3.2) for Closure Head Studs and Nuts that have an aging effect/mechanism of crack initiation and growth due to fatigue, and the Reactor Head Closure Studs Program (Section B2.1.3) for Closure Head Studs and Nuts that have an aging effect/mechanism of loss of material due to general corrosion. Not applicable for the Closure Head Stud Assembly since a borated water environment is not present in a BWR.
3.1.1.B-23	CASS pump casing and valve body	Loss of fracture toughness due to thermal aging embrittlement	Inservice inspection	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.1). .
3.1.1.B-24	CASS piping	Loss of fracture toughness due to thermal aging embrittlement	Thermal aging embrittlement of Cast Austenitic Stainless Steel	No	Not applicable because this component does not exist at NMP2.

Table 3.1.1.B NMP2 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.B-25	BWR piping and fittings; steam generator components	Wall thinning due to flow accelerated corrosion	Flow accelerated corrosion	No	Consistent with NUREG-1801 for valves with this aging effect/mechanism that are part of the Reactor Coolant Pressure Boundary (Note: NUREG-1801 Volume 2 Item IV.C1.3-a, which applies to this row number, addresses valves). Additionally, NMP2 Main Steam flow elements, which are part of the NMP2 Reactor Coolant Pressure Boundary, are consistent with, but not addressed in, NUREG-1801. Not applicable for the NMP2 RCS piping and fittings because they are either evaluated in different rows (3.1.1.B-01, 3.1.1.B-07, 3.1.1.B-29, and 3.1.1.B-31) or they have a different aging effect/mechanism Not applicable for steam generator components because NMPNS does not have steam generators.

Table 3.1.1.B NMP2 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.B-26	Reactor coolant pressure boundary (RCPB) valve closure bolting, manway and holding bolting, and closure bolting in high- pressure and high-temperature systems	Loss of material due to wear; loss of preload due to stress relaxation; crack initiation and growth due to cyclic loading and/or SCC	Bolting integrity	No	Consistent with NUREG-1801, with the following exceptions: • NMP2 credits the ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program (ISI Program) in lieu of the Bolting Integrity Program to manage the aging effect of loss of material in a high-pressure and high-temperature environment. As noted in Appendix B2.1.1, the ISI Program manages aging of pressure-retaining components including bolting. • Bolting that has an aging effect/mechanism of crack initiation and growth due to fatigue is evaluated in row 3.1.1.B-01. • The aging effect/mechanism of loss of preload due to stress relaxation is not an aging effect at NMP2 for this environment. • Not applicable for the CRD penetration flange bolting, manway bolting, and closure bolting since a borated water environment is not present in a BWR. • Not applicable for the pressurizer bolting because this component does not exist at NMP2.

Table 3.1.1.B NMP2 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.B-27	Feedwater and control rod drive (CRD) return line nozzles	Crack initiation and growth due to cyclic loading	Feedwater nozzle; CRD return line nozzle	No	The aging effect/mechanism is not applicable because crack initiation and growth due to cyclic loading (other than fatigue, row 3.1.1.B-01) does not exist at NMP2.
3.1.1.B-28	Vessel shell attachment welds	Crack initiation and growth due to SCC and/or IGSCC	BWR vessel ID attachment welds; water chemistry	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2). Additionally, the NMP2 Stub tube welds are consistent with, but not addressed in, NUREG-1801. For Reactor Vessel nickel based alloy weld overlays, NMP2 credits the ISI program (Appendix B2.1.1) in lieu of the BWR Vessel ID Attachment Welds Program. These weld are currently part of the ISI program, and this program adequately manages the aging effects for these components.

Table 3.1.1.B NMP2 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.B-29	Nozzle safe ends, recirculation pump casing, connected systems piping and fittings, body and bonnet of valves	Crack initiation and growth due to SCC and/or IGSCC	BWR stress corrosion cracking; water chemistry	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.6 and B2.1.2). Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Feedwater nozzle safe ends and thermal sleeves • Main Steam condensing chambers and restriction orifices (see Table 3.4.2.B-3) NMP2 credits the ISI Program in lieu of the BWR Stress Corrosion Cracking (SCC) Program for components that are currently part of the ISI Program. The BWR SCC program credits activities performed under the direction of the ISI Program. Thus, the ISI program is adequate for managing the aging effects for these components. NMP2 credits the One-Time Inspection Program (Appendix B2.1.20) in lieu of the BWR SCC program for small bore piping and valves because the BWR SCC program does not apply to small-bore piping and valves.
3.1.1.B-30	Penetrations	Crack initiation and growth due to SCC, IGSCC, and/or cyclic loading	BWR bottom head penetrations; water chemistry	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2).

Table 3.1.1.B NMP2 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.B-31	Core shroud and core plate, support structure, top guide, core spray lines and spargers, jet pump assemblies, control rod drive housing, and nuclear instrumentation guide tubes	Crack initiation and growth due to SCC, IGSCC, and/or IASCC	BWR vessel internals; water chemistry	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2). Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Access hole covers • Clamps and keepers • Core spray line brackets • Differential Pressure Liquid Control lines • Flanges • Peripheral Fuel supports • Head bolts • Steam Dryers
3.1.1.B-32	Core shroud and core plate access hole cover (welded and mechanical covers)	Crack initiation and growth due to SCC, IGSCC, and/or IASCC	ASME Section XI inservice inspection; water chemistry	No	The core shroud, access hole cover, and supporting components that have this aging effect/mechanism are evaluated in row 3.1.1.B-31 since NMP2 credits the BWR Vessel Internals Program (Appendix B2.1.8) and Water Chemistry Control Program (Appendix B2.1.2) for managing the aging effects for these components.
3.1.1.B-33	Jet pump assembly castings and orificed fuel support	Loss of fracture toughness due to thermal aging and neutron irradiation embrittlement	Thermal aging and neutron irradiation embrittlement	No	Not applicable for NMP2 since this aging effect/mechanism does not apply to these components. The jet pump assemblies and fuel supports are evaluated in row 3.1.1.B-31.

Table 3.1.1.B NMP2 Summary of Aging Management Programs for the Reactor Vessel, Internals, and Reactor Coolant Systems Evaluated in Chapter IV of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.1.1.B-34	Unclad top head and nozzles	Loss of material due to general, pitting, and crevice corrosion	Inservice inspection; water chemistry	No	This aging is not applicable to the NMP2 uncladded top head and nozzles. Rather, these components experience an aging effect/mechanism of crack initiation and growth due to fatigue. This is consistent with the evaluation for these components in BWRVIP-74-A, *BWR Vessel and Internals Project, BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines for License Renewal*. The NMP2 top head and nozzles are evaluated in row 3.1.1.B-01.
3.1.1.B-35	PWR only				
3.1.1.B-36	PWR only				
3.1.1.B-37	PWR only				
3.1.1.B-38	PWR only				
3.1.1.B-39	PWR only				
3.1.1.B-40	PWR only				
3.1.1.B-41	PWR only				
3.1.1.B-42	PWR only				
3.1.1.B-43	PWR only				
3.1.1.B-44	PWR only				
3.1.1.B-45	PWR only				
3.1.1.B-46	PWR only				
3.1.1.B-47	PWR only				

**Table 3.1.2.A-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Pressure Vessel – Summary of Aging Management Evaluation**

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bottom Head	PB SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.6-a	3.1.1.A-01	A
Nozzles	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.3-a	3.1.1.A-01	A C, 1
						IV.A1.3-d	3.1.1.A-01	A C, 1
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.A1.3-d	3.1.1.A-01	E
					BWR Feedwater Nozzle Program Fatigue Monitoring Program	IV.A1.3-d	3.1.1.A-01	E
Nozzle Safe Ends	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.3-a	3.1.1.A-01	C, 2

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Nozzle Safe Ends (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.A1.4-a	3.1.1.A-29	B D, 3
					Fatigue Monitoring Program	IV.A1.4-b	3.1.1.A-01	A C, 4
Penetrations: • Core Differential Pressure • CRD Stub Tube • Flux Monitor • Instrumentation • Vessel Drain	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	IV.A1.3-a	3.1.1.A-01	C, 54
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program			M

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Penetrations (cont'd)	PB	Nickel Based Alloys	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR Penetrations Program Water Chemistry Control Program	IV.A1.5-a	3.1.1.A-30	B
					Fatigue Monitoring Program	IV.A1.5-b	3.1.1.A-01	A
		Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.A1.4-a	3.1.1.A-29	D, 5
					Fatigue Monitoring Program	IV.A1.4-b	3.1.1.A-01	C, 5
					BWR Penetrations Program Water Chemistry Control Program	IV.A1.5-a	3.1.1.A-30	B
					Fatigue Monitoring Program	IV.A1.5-b	3.1.1.A-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Support Skirt and Attachment Welds	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, Moisture or Wetting, temperature <140°F	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			G
			Air, Moisture or Wetting, Temperature ≥ 212°F	Cracking	Fatigue Monitoring Program			G
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			G

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Thermal Sleeves	PB	Nickel Based Alloys	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.B1.4-b	3.1.1.A-01	C, 6
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	IV.B1.1-e	3.1.1.A-32	D, 6
	PB TS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			Q
	TS	Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.B1.3-b	3.1.1.A-01	A
					BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.3-a	3.1.1.A-31	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Top Head	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.1-b	3.1.1.A-01	C, 8
Top Head (Closure Studs and Nuts)	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program			H
				Loss of Material	Reactor Head Closure Studs Program			L
Top Head (Flanges)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.1-b	3.1.1.A-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Top Head (Leak Detection Lines)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.4-b	3.1.1.A-01	C, 9
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.A1.1-d	3.1.1.A-08	B
Top Head (Nozzles)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.3-d	3.1.1.A-01	C, 10

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program			H
Vessel Shell (Flange)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.2-a	3.1.1.A-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Vessel Shells • Beltline • Lower Shell • Upper Nozzle Shell • Upper RPV Shell	PB SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.2-a	3.1.1.A-01	A
						IV.A1.2-b	3.1.1.A-01	A
			Treated Water or Steam, High temperature, Neutron Fluence ≥ $1x10^{17}$ n/cm^2. - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.2-b	3.1.1.A-01	A
				Loss of Fracture Toughness	Reactor Vessel Surveillance Program	IV.A1.2-d	3.1.1.A-05	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Vessel Shell Welds (including attachment welds)	PB SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Treated Water or Steam, High temperature, Neutron Fluence ≥ $1x10^{17} n/cm^2$. - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.2-b	3.1.1.A-01	A
				Loss of Fracture Toughness	Reactor Vessel Surveillance Program	IV.A1.2-d	3.1.1.A-05	B
		Nickel Based Alloys	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR Vessel ID Attachment Welds Program BWR Vessel Internals Program Water Chemistry Control Program	IV.A1.2-e	3.1.1.A-28	E
					Fatigue Monitoring Program	IV.A1.4-b	3.1.1.A-01	C, 11
	SFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence ≥ $1x10^{17} n/cm^2$. - BWR Reactor Pressure Vessel	Cracking	BWR Vessel ID Attachment Welds Program Water Chemistry Control Program	IV.A1.2-e	3.1.1.A-28	B
					Fatigue Monitoring Program	IV.A1.4-b	3.1.1.A-01	C, 11

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
CRD Assemblies (includes drive mechanism and housing)	PB SFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.B1.5-b	3.1.1.A-01	C, 12
					BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.5-c	3.1.1.A-31	B
Control Rod Guide Tubes	SFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence $< 5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.5-c	3.1.1.A-31	D, 13
Core Plate and Bolts	SFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence $< 5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-b	3.1.1.A-31	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Core Shroud	DF SFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence ≥ $5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-a	3.1.1.A-31	B
Core Shroud Head Bolts and Collars	SFS	Nickel Based Alloys	Treated Water or Steam, temperature ≥ 482°F	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-f	3.1.1.A-31	D, 14
					Fatigue Monitoring Program	IV.B1.4-b	3.1.1.A-01	C, 14
		Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-b	3.1.1.A-31	B
					Fatigue Monitoring Program	IV.B1.1-c	3.1.1.A-01	C, 55

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Core Shroud Support Structures • Clamps • Core Plate Spacers • Support Plates • Support Rings • Support Welds • Tie Rod Assemblies	SFS	Nickel Based Alloys	Treated Water or Steam, temperature ≥ 482°F	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-f	3.1.1.A-31	B
					Fatigue Monitoring Program	IV.B1.4-b	3.1.1.A-01	C, 16
			Treated Water or Steam, High temperature, Neutron Fluence ≥ 5x10^{20} n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-f	3.1.1.A-31	D, 15
		Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-b	3.1.1.A-31	D, 56
					Fatigue Monitoring Program	IV.B1.1-c	3.1.1.A-01	C, 56

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Core Shroud Support Structures (cont'd)	SFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence ≥ $5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-a	3.1.1.A-31	D, 15, 57
Core Spray Lines and Spargers	DF	Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence < $5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.3-a	3.1.1.A-31	B
	SFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence < $5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.3-a	3.1.1.A-31	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

**Table 3.1.2.A-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation**

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Incore Instrumentation Dry Tubes and Guide Tubes	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence ≥ $5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.6-a	3.1.1.A-31	B
Orificed Fuel Support	DF SFS	Cast Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence < $5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	None	None			None
Steam Dryer	NSR Functional Support	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.B1.1-c	3.1.1.A-01	C, 17
					BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-a	3.1.1.A-31	D, 17

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Top Guides	SFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence ≥ $5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.2-a	3.1.1.A-31	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-3 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Vessel Instrumentation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Closure Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program	IV.C1.3-g	3.1.1.A-01	A
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.C1.3-e	3.1.1.A-26	E
Condensing Pots	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	IV.C1.1-h	3.1.1.A-01	C, 18
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 18
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature < 140°F, Low Flow	Cracking Loss of Material	Water Chemistry Control Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

**Table 3.1.2.A-3 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Vessel Instrumentation System – Summary of Aging Management Evaluation**

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	B
Temperature Equalizing Columns	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	IV.C1.1-h	3.1.1.A-01	C, 18
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 18

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-3 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Vessel Instrumentation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			H
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 19
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Recirculation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Closure Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program	IV.C1.2-f	3.1.1.A-01	A
						IV.C1.3-g	3.1.1.A-01	A
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.C1.2-d	3.1.1.A-26	E
						IV.C1.3-e	3.1.1.A-26	E
Flow Elements	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.C1.1-f	3.1.1.A-29	D, 20
					Fatigue Monitoring Program	IV.C1.1-h	3.1.1.A-01	C, 20
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature < 140°F, Low Flow Treated Water or Steam, temperature ≥ 482°F	Cracking Loss of Material	Water Chemistry Control Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

**Table 3.1.2.A-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Recirculation System – Summary of Aging Management Evaluation**

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment (cont'd)	PFASRE	Any	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking Loss of Material	Water Chemistry Control Program			J
Piping and Fittings	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.C1.1-f	3.1.1.A-29	B
					Fatigue Monitoring Program	IV.C1.1-h	3.1.1.A-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Recirculation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	B
Pumps	PB	Cast Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.C1.2-a	3.1.1.A-01	A
					BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.C1.2-b	3.1.1.A-29	B
				Loss of Fracture Toughness	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.C1.2-c	3.1.1.A-23	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Recirculation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Pump Seal Flanges	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.C1.2-a	3.1.1.A-01	A
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program			Q
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			H, 21
					One-Time Inspection Program Water Chemistry Control Program			H

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Recirculation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Cast Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.A-29	E
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 49
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A
				Loss of Fracture Toughness	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.C1.3-b	3.1.1.A-23	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

**Table 3.1.2.A-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Reactor Recirculation System – Summary of Aging Management Evaluation**

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 49
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 49
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-5 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Control Rod Drive System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Accumulators	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			P
		Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 50

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-5 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Control Rod Drive System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Filters	PB	Cast Austenitic Stainless Steel	Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 23
					One-Time Inspection Program Water Chemistry Control Program			Q

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-5 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Control Rod Drive System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature ≥ 140°F, but < 212°F Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			H

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-5 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Control Rod Drive System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	B
					One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	E, 24

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-5 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Control Rod Drive System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			H
		Cast Austenitic Stainless Steel	Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.A-29	E, 24
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 49

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-5 Reactor Vessel, Internals, and Reactor Coolant System NMP1 Control Rod Drive System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Dried Air or Gas	None	None			None
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Selective Leaching of Materials Program Water Chemistry Control Program			M
		Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 49

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.A-5 Reactor Vessel, Internals, and Reactor Coolant System
NMP1 Control Rod Drive System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.A-29	E, 24
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 49

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bottom Head	PB SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.6-a	3.1.1.B-01	A
Nozzles	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.3-a	3.1.1.B-01	A
						IV.A1.3-d	3.1.1.B-01	A
								C, 25
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.3-d	3.1.1.B-01	C, 26
Nozzle Safe Ends	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.3-a	3.1.1.B-01	C, 27
						IV.A1.3-d	3.1.1.B-01	C, 28

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Nozzle Safe Ends (cont'd)	PB	Nickel Based Alloys	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.A1.4-a	3.1.1.B-29	D, 52
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	IV.A1.4-a	3.1.1.B-29	E
					Fatigue Monitoring Program	IV.A1.4-b	3.1.1.B-01	C, 29
		Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	IV.A1.4-a	3.1.1.B-29	E
					Fatigue Monitoring Program	IV.A1.4-b	3.1.1.B-01	C, 30

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Nozzle Thermal Sleeves	PB	Nickel Based Alloys	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.A1.4-a	3.1.1.B-29	D, 53
					Fatigue Monitoring Program	IV.A1.4-b	3.1.1.B-01	C, 31
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program			Q
		Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.A1.4-a	3.1.1.B-29	D, 53
					Fatigue Monitoring Program	IV.A1.4-b	3.1.1.B-01	C, 32

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Nozzle Thermal Sleeves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program			Q
Penetrations: • Core Differential Pressure and Liquid Control • CRD Stub Tubes • Drain Lines • Incore Instruments • Instrumentation	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.3-d	3.1.1.B-01	C, 5, 7
		Nickel Based Alloys	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR Penetrations Program Water Chemistry Control Program	IV.A1.5-a	3.1.1.B-30	B
					Fatigue Monitoring Program	IV.A1.5-b	3.1.1.B-01	A
		Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR Penetrations Program Water Chemistry Control Program	IV.A1.5-a	3.1.1.B-30	B
					Fatigue Monitoring Program	IV.A1.5-b	3.1.1.B-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Support Skirt	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air With Thermal Fatigue	Cracking	Fatigue Monitoring Program	IV.A1.7-a	3.1.1.B-01	A
				Loss of Material	Systems Walkdown Program			H
Top Head and Nozzles	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.1-b	3.1.1.B-01	C, 8, 33
Top Head (Closure Studs and Nuts)	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program			G
				Loss of Material	Reactor Head Closure Studs Program			L
Top Head (Flanges)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.1-b	3.1.1.B-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Top Head (Leak Detection Lines)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.1-b	3.1.1.B-01	C, 9
Vessel Shells (Flange)	PB SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.2-a	3.1.1.B-01	A
Vessel Shells • Lower Intermediate Shell • Lower Shell • Upper Intermediate Shell • Upper Shell	PB SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.2-a	3.1.1.B-01	A
			Treated Water or Steam, High temperature, Neutron Fluence ≥ $1x10^{17} n/cm^2$. – BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.2-a	3.1.1.B-01	A
						IV.A1.2-b	3.1.1.B-01	A
				Loss of Fracture Toughness	Reactor Vessel Surveillance Program	IV.A1.2-d	3.1.1.B-05	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Vessel Welds (including attachment welds)	PB	Nickel Based Alloys	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR Vessel ID Attachment Welds Program Water Chemistry Control Program	IV.A1.2-e	3.1.1.B-28	D, 34
					Fatigue Monitoring Program	IV.A1.4-b	3.1.1.B-01	C, 34
	PB SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, High temperature, Neutron Fluence ≥ $1x10^{17} n/cm^2$. – BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.2-b	3.1.1.B-01	A
				Loss of Fracture Toughness	Reactor Vessel Surveillance Program	IV.A1.2-d	3.1.1.B-05	B
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.2-b	3.1.1.B-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Vessel Welds (including attachment welds) (cont'd)	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.2-b	3.1.1.B-01	C, 11
		Nickel Based Alloys	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR Vessel ID Attachment Welds Program Water Chemistry Control Program	IV.A1.2-e	3.1.1.B-28	B
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	IV.A1.2-e	3.1.1.B-28	E
					Fatigue Monitoring Program	IV.A1.4-b	3.1.1.B-01	C, 11

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-1 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Vessel Welds (including attachment welds) (cont'd)	SFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR Vessel ID Attachment Welds Program Water Chemistry Control Program	IV.A1.2-e	3.1.1.B-28	B
					Fatigue Monitoring Program	IV.A1.4-b	3.1.1.B-01	C, 11

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Access Hole Covers	PB	Nickel Based Alloys	Treated Water or Steam, High temperature, Neutron Fluence < 5x10^{20} n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-f	3.1.1.B-31	D, 35
		Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence < 5x10^{20} n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.2-a	3.1.1.B-31	D, 35
CRD Assemblies (includes drive mechanism and housing)	PB SFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.B1.5-b	3.1.1.B-01	C, 36
					BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.5-c	3.1.1.B-31	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Control Rod Guide Tubes	PB SFS	Cast Austenitic Stainless Steel	Treated Water or Steam, High Temperature, Neutron Fluence < $5x10^{20}$ $n/cm.^2$-BWR Reactor Vessel Internals	None	None			None
		Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature, Neutron Fluence < $5x10^{20}$ $n/cm.^2$-BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.5-c	3.1.1.B-31	B
Core Plate, Bolts, and Supports	SFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature, Neutron Fluence < $5x10^{20}$ $n/cm.^2$-BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-b	3.1.1.B-31	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Core Shroud	DF SFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence ≥ $5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-a	3.1.1.B-31	B
Core Shroud Head Bolts	SFS	Nickel Based Alloys	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program			F
		Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-b	3.1.1.B-31	D, 37
					Fatigue Monitoring Program	IV.B1.1-c	3.1.1.B-01	C, 37

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Core Shroud Support Structures • Bolts • Brackets • Cap Screws • Clamps • Keepers • Restraints • Supports	SFS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Treated Water or Steam, High temperature, Neutron Fluence $< 5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program			J
		Nickel Based Alloys	Treated Water or Steam, High temperature, Neutron Fluence $\geq 1x10^{17}$n/cm^2. – BWR Reactor Pressure Vessel	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-f	3.1.1.B-31	B
					Fatigue Monitoring Program			F
		Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence $< 5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-b	3.1.1.B-31	B
						IV.B1.3-a	3.1.1.B-31	D, 38

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Core Spray Lines and Spargers	DF PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence < $5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.3-a	3.1.1.B-31	B
	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence < $5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.3-a	3.1.1.B-31	B
Differential Pressure Liquid Control Line	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence < $5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.3-a	3.1.1.B-31	D, 39

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Flanges	SFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence < $5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-a	3.1.1.B-31	D, 40
Incore Housings	PB SFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature, Neutron Fluence < $5x10^{20}$ n/cm.^{2}- BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.6-a	3.1.1.B-31	B
Incore Instrumentation Dry Tubes	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature, Neutron Fluence < $5x10^{20}$ n/cm.^{2}- BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.6-a	3.1.1.B-31	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Jet Pump Assemblies	DF	Cast Austenitic Stainless Steel	Treated Water or Steam, High Temperature, Neutron Fluence < $5x10^{20}$ n/cm.^{2}- BWR Reactor Vessel Internals	None	None			None
		Nickel Based Alloys	Treated Water or Steam, High Temperature, Neutron Fluence < $5x10^{20}$ n/cm.^{2}- BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.4-a	3.1.1.B-31	B
		Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature, Neutron Fluence < $5x10^{20}$ n/cm.^{2}- BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.4-a	3.1.1.B-31	B
	SFS	Cast Austenitic Stainless Steel	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.B1.4-b	3.1.1.B-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Jet Pump Assemblies (cont'd)	SFS	Nickel Based Alloys	Treated Water or Steam, High Temperature, Neutron Fluence < $5x10^{20}$ n/cm.^{2}- BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.4-a	3.1.1.B-31	B
		Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.4-a	3.1.1.B-31	B
					Fatigue Monitoring Program	IV.B1.4-b	3.1.1.B-01	A
			Treated Water or Steam, High Temperature, Neutron Fluence < $5x10^{20}$ n/cm.^{2}- BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.4-a	3.1.1.B-31	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Jet Pump Assemblies (cont'd)	TS	Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature, Neutron Fluence < $5x10^{20}$ n/cm.^{2}- BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.4-a	3.1.1.B-31	B
LPCI Couplings	DF PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature, Neutron Fluence < $5x10^{20}$ n/cm.^{2}- BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-g	3.1.1.B-31	B
Orificed Fuel Supports	DF SFS	Cast Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence < $5x10^{20}$ n/cm^{2}. – BWR Reactor Vessel Internals	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Peripheral Fuel Supports	SFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature, Neutron Fluence < $5x10^{20}$ n/cm.^{2}- BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.5-c	3.1.1.B-31	D, 41
Power Range Detector Assemblies	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, High Temperature, Neutron Fluence < $5x10^{20}$ n/cm.^{2}- BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.6-a	3.1.1.B-31	B
Spray Nozzles	DF PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, High Temperature - BWR Reactor Pressure Vessel	Cracking	Fatigue Monitoring Program	IV.A1.3-d	3.1.1.B-01	C, 42

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-2 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Internals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Steam Dryer	NFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.1-a	3.1.1.B-31	D, 17
					Fatigue Monitoring Program	IV.B1.1-c	3.1.1.B-01	C, 17
Top Guide and Supports	SFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, High temperature, Neutron Fluence ≥ $5x10^{20}$ n/cm^2. – BWR Reactor Vessel Internals	Cracking	BWR Vessel Internals Program Water Chemistry Control Program	IV.B1.2-a	3.1.1.B-31	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-3 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Instrumentation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Closure Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program	IV.C1.3-g	3.1.1.B-01	A
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.C1.3-e	3.1.1.B-26	E
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program	IV.C1.3-g	3.1.1.B-01	A
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			H, 43
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.C1.3-e	3.1.1.B-26	E
Condensing Chambers	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	D, 44

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-3 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Instrumentation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	NFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	B
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, Moisture or Wetting, temperature ≥ 140°F	Loss of Material	Systems Walkdown Program			H, 45
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-3 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Instrumentation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			H
		Nickel Based Alloys	Air, Moisture or Wetting, temperature ≥ 140°F	Loss of Material	Systems Walkdown Program			N, 46
			Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-3 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Instrumentation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Nickel Based Alloys	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			F
		Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature ≥ 140°F	Cracking	Systems Walkdown Program			G, 47
				Loss of Material	Systems Walkdown Program			L, 47
			Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-3 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Instrumentation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	B
Radiation Collars	RS	Wrought Austenitic Stainless Steel	Air	None	None			None
Restriction Orifices	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	D, 48

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-3 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Pressure Vessel Instrumentation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Vacuum Breakers	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
Valves	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.B-29	E, 24
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.B-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Recirculation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Closure Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program	IV.C1.2-f	3.1.1.B-01	A
						IV.C1.3-g	3.1.1.B-01	A
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.C1.2-d	3.1.1.B-26	E
						IV.C1.3-e	3.1.1.B-26	E
		Wrought Austenitic Stainless Steel	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program			F
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature < 140°F, Low Flow Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking Loss of Material	Water Chemistry Control Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Recirculation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment (cont'd)	PFASRE	Any	Treated Water or Steam, temperature ≥ 482°F Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking Loss of Material	Water Chemistry Control Program			J
Piping and Fittings	PB	Nickel Based Alloys	Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Recirculation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Nickel Based Alloys	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			F
		Wrought Austenitic Stainless Steel	Hydraulic Fluid	None	None			None
			Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

**Table 3.1.2.B-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Recirculation System – Summary of Aging Management Evaluation**

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	IV.C1.1-f	3.1.1.B-29	E
					Fatigue Monitoring Program	IV.C1.1-h	3.1.1.B-01	A
			Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Recirculation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	B
Pumps	PB	Cast Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.C1.2-a	3.1.1.B-01	A
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	IV.C1.2-b	3.1.1.B-29	E
				Loss of Fracture Toughness	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.C1.2-c	3.1.1.B-23	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Recirculation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Pumps (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.C1.2-a	3.1.1.B-01	A
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program			F
Radiation Collars	RS	Wrought Austenitic Stainless Steel	Air	None	None			None
Restriction Orifices	FR PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	D, 48

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Recirculation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Restriction Orifices (cont'd)	FR PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	D, 48
Seal Coolers	HT PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	One-Time Inspection Program Water Chemistry Control Program			Q
Valves	PB	Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.B-29	E, 24

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Recirculation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Cast Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.B-29	E
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.B-01	A
			Treated Water or Steam, temperature ≥ 482°F	Loss of Fracture Toughness	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.C1.3-b	3.1.1.B-23	B
		Wrought Austenitic Stainless Steel	Hydraulic Fluid	None	None			None
			Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.B-29	E, 24

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Recirculation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.B-29	E
					One-Time Inspection Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.B-29	E, 24
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.B-01	A
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	D, 49

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-4 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Reactor Recirculation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.B-29	E, 24
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.B-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-5 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Control Rod Drive System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Accumulators	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Dried Air or Gas	None	None			None
			Treated Water or Steam, temperature ≥212°F, but < 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	D, 50
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			Q

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

**Table 3.1.2.B-5 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Control Rod Drive System – Summary of Aging Management Evaluation**

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
CRD Hydraulic Control Units	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	D, 51
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			Q
Filters	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			Q

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-5 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Control Rod Drive System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Filters (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
Flow Elements	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
Flow Indicators	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
Flow Orifices	FR PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-5 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Control Rod Drive System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature < 140°F, Low Flow Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cracking Loss of Material	Water Chemistry Control Program			J
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			H, 22

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-5 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Control Rod Drive System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			H, 24
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	B
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			H, 22

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-5 Reactor Vessel, Internals, and Reactor Coolant System NMP2 Control Rod Drive System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			H, 24
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	E, 24
Pumps	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			H

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-5 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Control Rod Drive System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Rupture Discs	PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			H, 24
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.B-01	A
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			H, 22
					One-Time Inspection Program Water Chemistry Control Program			H, 24

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.1.2.B-5 Reactor Vessel, Internals, and Reactor Coolant System
NMP2 Control Rod Drive System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
		Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
			Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Notes for Tables 3.1.2.A-1 through 3.1.2.B-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 item for material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

D. Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.

E. Consistent with NUREG-1801 for material, environment, and aging effect, but a different aging management program is credited.

F. Material not in NUREG-1801 for this component.

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

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

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

J. Neither the component nor the material and environment combination is evaluated in NUREG-1801.

K. Material and environment not in NUREG-1801 for this component and aging effect.

L. Aging effect and environment not in NUREG-1801 for this component and material.

M. Aging effect and material not in NUREG-1801 for this component and environment.

N. Aging effect, material, and environment not in NUREG-1801 for this component.

P. Component and aging effect not in NUREG-1801 for this material and environment.

Q. Component not in NUREG-1801 for this material, environment, and aging effect.

(Note “O” was not used to avoid confusion with the number zero)

Plant Specific Notes:

1. Core Spray nozzles, Emergency Condenser Steam outlet nozzles, and Reactor Recirculation nozzles are not identified in NUREG-1801 for this GALL row number.

2. Feedwater nozzle safe ends and Steam nozzle safe ends are not identified in NUREG-1801 for this GALL row number.

3. Emergency Condenser Steam nozzle safe ends are not identified in NUREG-1801 for this GALL row number.

4. Core differential pressure nozzle safe ends, Core Spray nozzle safe ends, Emergency Condenser Steam nozzle safe ends, Safety Valve nozzle safe ends, and Reactor Recirculation nozzle safe ends are not identified in NUREG-1801 for this GALL row number.

5. Instrumentation Penetrations are not identified in NUREG-1801 for this GALL row number.

6. Feedwater Sparger thermal sleeves and are not identified in NUREG-1801 for this GALL row number.

7. Drain line penetrations are not identified in NUREG-1801 for this GALL row number.

8. The NMP1 Reactor Vessel Top Head (with cladding) and the NMP2 Reactor Vessel Top Head (without cladding) are not identified in NUREG-1801 for this GALL row number.

9. Reactor Vessel flange leak detection lines are not identified in NUREG-1801 for this GALL row number.
10. Top Head nozzles are not identified in NUREG-1801 for this GALL row number.
11. Reactor Vessel attachment welds are not identified in NUREG-1801 for this GALL row number.
12. Control Rod Drive assemblies are not identified in NUREG-1801 for this GALL row number.
13. Control Rod Guide Tubes are not identified in NUREG-1801 for this GALL row number.
14. Core Shroud head bolts are not identified in NUREG-1801 for this GALL row number.
15. Core Shroud spacers and tie rods are not identified in NUREG-1801 for this GALL row number.
16. Core Shroud support plates and welds are not identified in NUREG-1801 for this GALL row number.
17. Steam Dryers are not identified in NUREG-1801 for this GALL row number.
18. Condensing Pots and Temperature Equalizing Columns are not identified in NUREG-1801 for this GALL row number.
19. Reactor Vessel Instrumentation Valves are not identified in NUREG-1801 for this GALL row number.
20. Flow Elements are not identified in NUREG-1801 for this GALL row number.
21. Valve VLV-32-424 is part of the reactor coolant pressure boundary and is included in the ISI program.
22. This row applies to small bore valves and piping that are included in the Inservice Inspection Testing program.
23. These filters are part of the reactor coolant pressure boundary and are not identified in NUREG-1801 for this GALL row number.
24. This row applies to small bore valves and piping that are not included in the Inservice Inspection Testing program.

25. Core Spray nozzles, Drain nozzles and Residual Heat Removal nozzles are not identified in NUREG-1801 for this GALL row number.

26. Jet Pump Instrumentation nozzles and Reactor Recirculation nozzles are not identified in NUREG-1801 for this GALL row number.

27. Core Spray nozzle safe ends and Main Steam nozzle safe ends are not identified in NUREG-1801 for this GALL row number.

28. CRD Return Line nozzle safe ends, Residual Heat Removal nozzle safe ends, and Feedwater nozzle safe ends are not identified in NUREG-1801 for this GALL row number.

29. Core Spray nozzle safe ends, Feedwater nozzle safe ends, and Residual Heat Removal nozzle safe ends are not identified in NUREG-1801 for this GALL row number.

30. Reactor Recirculation nozzle safe ends and Jet Pump Instrumentation nozzle safe ends are not identified in NUREG-1801 for this GALL row number.

31. Core Spray nozzle thermal sleeves and Feedwater nozzle thermal sleeves are not identified in NUREG-1801 for this GALL row number.

32. Core Spray nozzle thermal sleeves, CRD Return Line nozzle thermal sleeves, Feedwater nozzle thermal sleeves, Residual Heat Removal nozzle thermal sleeves, and Reactor Recirculation nozzle thermal sleeves are not identified in NUREG-1801 for this GALL row number.

33. Top Head nozzles, spray nozzles, and vent nozzles are not identified in NUREG-1801 for this GALL row number.

34. Stub Tube Welds are not identified in NUREG-1801 for this GALL row number.

35. Access hole covers are not identified in NUREG-1801 for this GALL row number.

36. Control Rod Drive housings are not identified in NUREG-1801 for this GALL row number.

37. Head bolts are not identified in NUREG-1801 for this GALL row number.
38. Head clamps, keepers, and core spray line brackets are not identified in NUREG-1801 for this GALL row number.
39. Differential Pressure Liquid Control lines are not identified in NUREG-1801 for this GALL row number.
40. Flanges are not identified in NUREG-1801 for this GALL row number.
41. Peripheral fuel supports are not identified in NUREG-1801 for this GALL row number.
42. Head Cooling spray nozzles are not identified in NUREG-1801 for this GALL row number.
43. This row applies to bolting that has an aging effect/mechanism of cracking/stress corrosion cracking which is not addressed in NUREG-1801 Volume 2 Items IV.C1.2-d, IV.C1.2-e, IV.C1.2-f, IV.C1.3-e, IV.C1.3-f, or IV.C1.3-g.
44. Condensing chambers are not identified in NUREG-1801 for this GALL row number.
45. This row applies to the external surfaces of carbon steel components.
46. This row applies to the external surfaces of nickel based alloy components.
47. This row applies to the external surfaces of stainless steel components.
48. Restriction orifices are not identified in NUREG-1801 for this GALL row number.
49. Valves are not identified in NUREG-1801 for this GALL row number.
50. Accumulators are not identified in NUREG-1801 for this GALL row number.
51. Control Rod Hydraulic Control Units are not identified in NUREG-1801 for this GALL row number.
52. Feedwater Nozzle safe ends are not identified in NUREG-1801 for this GALL row number.

53. Feedwater Nozzle thermal sleeves are not identified in NUREG-1801 for this GALL row number.

54. Vessel Drain Penetrations are not identified in NUREG-1801 for this GALL row number.

55. Core Shroud collars are not identified in NUREG-1801 for this GALL row number.

56. Core Shroud support rings are not identified in NUREG-1801 for this GALL row number.

57. Core Shroud clamps are not identified in NUREG-1801 for this GALL row number.

3.2 AGING MANAGEMENT OF ENGINEERED SAFETY FEATURES

3.2.1 INTRODUCTION

This section provides the results of the aging management review for those components identified in Section 2.3.2, Engineered Safety Features (ESF) Systems, as being subject to aging management review. The systems, or portions of systems, which are addressed in this section, are described in the indicated sections.

NMP1

- NMP1 Containment Spray System (Section 2.3.2.A.2)
- NMP1 Core Spray System (Section 2.3.2.A.3)
- NMP1 Emergency Cooling System (Section 2.3.2.A.4)

NMP2

- NMP2 Hydrogen Recombiner System (Section 2.3.2.B.2)
- NMP2 High Pressure Core Spray System (Section 2.3.2.B.3)
- NMP2 Low Pressure Core Spray System (Section 2.3.2.B.4)
- NMP2 Reactor Core Isolation Cooling System (Section 2.3.2.B.6)
- NMP2 Residual Heat Removal System (Section 2.3.2.B.7)
- NMP2 Standby Gas Treatment System (Section 2.3.2.B.8)

Tables 3.2.1.A, NMP1 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-1801, and 3.2.1.B, NMP2 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-1801, provide the summary of the programs evaluated in NUREG-1801 for the ESF component groups that are relied on for license renewal.

These tables use the format described in Section 3.0. Note that these tables only include results for those component groups that are applicable to a BWR.

3.2.2 RESULTS

The following tables summarize the results of the aging management review for systems in the ESF group.

NMP1

- Table 3.2.2.A-1 Engineered Safety Features Systems - NMP1 Containment Spray System – Summary of Aging Management Evaluation
- Table 3.2.2.A-2 Engineered Safety Features Systems - NMP1 Core Spray System – Summary of Aging Management Evaluation
- Table 3.2.2.A-3 Engineered Safety Features Systems - NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

NMP2

- Table 3.2.2.B-1 Engineered Safety Features Systems - NMP2 Hydrogen Recombiner System – Summary of Aging Management Evaluation
- Table 3.2.2.B-2 Engineered Safety Features Systems - NMP2 High Pressure Core Spray System – Summary of Aging Management Evaluation
- Table 3.2.2.B-3 Engineered Safety Features Systems - NMP2 Low Pressure Core Spray System – Summary of Aging Management Evaluation
- Table 3.2.2.B-4 Engineered Safety Features Systems - NMP2 Reactor Core Isolation Cooling System – Summary of Aging Management Evaluation
- Table 3.2.2.B-5 Engineered Safety Features Systems - NMP2 Residual Heat Removal System – Summary of Aging Management Evaluation
- Table 3.2.2.B-6 Engineered Safety Features Systems - NMP2 Standby Gas Treatment System – Summary of Aging Management Evaluation

The materials from which specific components are fabricated, the environments to which components are exposed, the 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 3.2.2.A, NMP1 Materials, Environments, Aging

Effects Requiring Management and Aging Management Programs, and Section 3.2.2.B, NMP2 Materials, Environments, Aging Effects Requiring Management and Aging Management Programs:

NMP1

- Section 3.2.2.A.1, NMP1 Containment Spray System
- Section 3.2.2.A.2, NMP1 Core Spray System
- Section 3.2.2.A.3, NMP1 Emergency Cooling System

NMP2

- Section 3.2.2.B.1, NMP2 Hydrogen Recombiner System
- Section 3.2.2.B.2, NMP2 High Pressure Core Spray System
- Section 3.2.2.B.3, NMP2 Low Pressure Core Spray System
- Section 3.2.2.B.4, NMP2 Reactor Core Isolation Cooling System
- Section 3.2.2.B.5, NMP2 Residual Heat Removal System
- Section 3.2.2.B.6, NMP2 Standby Gas Treatment System

3.2.2.A NMP1 MATERIALS, ENVIRONMENTS, AGING EFFECTS REQUIRING MANAGEMENT AND AGING MANAGEMENT PROGRAMS

3.2.2.A.1 NMP1 CONTAINMENT SPRAY SYSTEM

Materials

The materials of construction for the NMP1 Containment Spray System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Copper Alloys (Zinc ≤ 15%)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Gray Cast Iron
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Containment Spray System components are exposed to the following environments:

- Air
- Air with Moisture or Wetting, temperature < 140°F
- Raw Water
- Raw Water, Low Flow
- Treated Water, temperature < 140°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Containment Spray System, requires management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Containment Spray System components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- One-Time Inspection Program
- Open-Cycle Cooling Water System Program
- Selective Leaching of Materials Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.2.2.A.2 NMP1 CORE SPRAY SYSTEM

Materials

The materials of construction for the NMP1 Core Spray System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Gray Cast Iron

- Wrought Austenitic Stainless Steel

Environments

The NMP1 Core Spray System components are exposed to the following environments:

- Air
- Air with Moisture or Wetting, temperature < 140°F
- Lubricating Oil
- Treated Water, Temperature ≥ 140°F, but < 212°F, Low Flow
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Core Spray System, require management:

- Cracking
- Loss of Heat Transfer
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Core Spray System components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- Fatigue Monitoring Program
- One-Time Inspection Program
- Preventive Maintenance Program
- Selective Leaching of Materials Program

- Systems Walkdown Program
- Water Chemistry Control Program

3.2.2.A.3 NMP1 EMERGENCY COOLING SYSTEM

Materials

The materials of construction for the NMP1 Emergency Cooling System components are:

- Aluminum alloys containing copper or zinc as the primary alloying elements
- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Glass
- Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Emergency Cooling System components are exposed to the following environments:

- Air
- Air with Moisture or Wetting, temperature ≥ 140°F
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F
- Treated Water, temperature < 140°F

- Treated Water, temperature < 140°F, Low Flow
- Treated Water, Temperature ≥ 140°F, but < 212°F
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow
- Treated Water or Steam, temperature ≥ 482°F
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Emergency Cooling System, require management:

- Cracking
- Loss of Fracture Toughness
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Emergency Cooling System components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- Fatigue Monitoring Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Preventive Maintenance Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.2.2.B NMP2 MATERIALS, ENVIRONMENTS, AGING EFFECTS REQUIRING MANAGEMENT AND AGING MANAGEMENT PROGRAMS

3.2.2.B.1 NMP2 HYDROGEN RECOMBINER SYSTEM

Materials

The materials of construction for the NMP2 Hydrogen Recombiner System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels
- Wrought Austenitic Stainless Steel

Environment

The NMP2 Hydrogen Recombiner System components are exposed to the following environment:

- Air with Moisture or Wetting, temperature < 140°F

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Hydrogen Recombiner System, requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effect for the NMP2 Hydrogen Recombiner System components:

- One-Time Inspection Program
- Systems Walkdown Program

3.2.2.B.2 NMP2 HIGH PRESSURE CORE SPRAY SYSTEM

Materials

The materials of construction for the NMP2 High Pressure Core Spray System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels
- Nickel Based Alloys
- Wrought Austenitic Stainless Steel

Environments

The NMP2 High Pressure Core Spray System components are exposed to the following environments:

- Air with Moisture or Wetting, temperature < 140°F
- Air with Moisture or Wetting, temperature ≥ 140°F
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F
- Treated Water, temperature < 140°F, Low Flow
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 High Pressure Core Spray System, require management:

- Cracking

- Loss of Material

3.2.2.B.3 NMP2 LOW PRESSURE CORE SPRAY SYSTEM

Materials

The materials of construction for the NMP2 Low Pressure Core Spray System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Low Pressure Core Spray System components are exposed to the following environments:

- Air with Moisture or Wetting, temperature ≥ 140°F
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F
- Treated Water, temperature < 140°F
- Treated Water, temperature < 140°F, Low Flow
- Treated Water, Temperature ≥ 140°F, but < 212°F
- Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow
- Treated Water or Steam, temperature ≥ 482°F
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Low Pressure Core Spray System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Low Pressure Core Spray System components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- Fatigue Monitoring Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.2.2.B.4 NMP2 REACTOR CORE ISOLATION COOLING SYSTEM

Materials

The materials of construction for the NMP2 Reactor Core Isolation Cooling System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels
- Nickel Based Alloys
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Reactor Core Isolation Cooling System components are exposed to the following environments:

- Air
- Air with Moisture or Wetting, temperature ≥ 140°F
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F
- Lubricating Oil
- Treated Water, temperature < 140°F
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow

- Treated Water or Steam, temperature ≥ 482°F
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Reactor Core Isolation Cooling System, require management:

- Cracking
- Loss of Fracture Toughness
- Loss of Material
- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Reactor Core Isolation Cooling System components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- Fatigue Monitoring Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Preventive Maintenance Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.2.2.B.5 NMP2 RESIDUAL HEAT REMOVAL SYSTEM

Materials

The materials of construction for the NMP2 Residual Heat Removal System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Residual Heat Removal System components are exposed to the following environments:

- Air with Moisture or Wetting, temperature ≥ 140°F
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F
- Raw Water, Low Flow
- Treated Water, temperature < 140°F, Low Flow
- Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Residual Heat Removal System, require management:

- Cracking
- Loss of Heat Transfer
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Residual Heat Removal System components:

- ASME Section XI, Subsections IWB, IWC, & IWD, Inservice Inspection Program
- Fatigue Monitoring Program
- One-Time Inspection Program
- Open-Cycle Cooling Water System Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.2.2.B.6 NMP2 STANDBY GAS TREATMENT SYSTEM

Materials

The materials of construction for the NMP2 Standby Gas Treatment System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels

- Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon

- Wrought Austenitic Stainless Steel

Environments

The NMP2 Standby Gas Treatment System components are exposed to the following environments:

- Air

- Air with Moisture or Wetting, temperature < 140°F

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Standby Gas Treatment System, requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effect for the NMP2 Standby Gas Treatment System components:

- One-Time Inspection Program

- Systems Walkdown Program

3.2.3 TIME-LIMITED AGING ANALYSES

The Time-Limited Aging Analyses (TLAAs) identified below are associated with the ESF components. The section of the LRA that contains the TLAA review results is indicated in parenthesis.

- Metal Fatigue Analysis (Section 4.3)

3.2.4 CONCLUSIONS

The ESF components that are subject to aging management review have been identified in accordance with the requirements of 10 CFR 54.4. The aging management programs selected to manage aging effects for the ESF components are identified in the summary tables and Section 3.2.2. A description of these aging management programs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation. Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the ESF components will be 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.A NMP1 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-18011

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.A-01	Piping, fittings, and valves in emergency core cooling system	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Consistent with NUREG-1801. Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Valves [Note: the NUREG-1801 Volume 2 Item that addresses valves (i.e., V.D1.4-a), applies to PWRs only] The TLAA is further evaluated in Section 4.3.
3.2.1.A-02	Piping, fittings, pumps, and valves in emergency core cooling system	Loss of material due to general corrosion	Water chemistry and one-time inspection	Yes, detection of aging effects is to be further evaluated	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2). For piping, fittings, and valves in the Containment Spray System and valves in the Emergency Cooling System that have an aging effect/mechanism of loss of material due to general corrosion, NMP1 also credits the ASME Section XI Inservice Inspection (ISI) (Subsections IWB, IWC, IWD) Program since these components are currently part of the ISI program. Further evaluation is documented in Appendix B2.1.2 (Water Chemistry Program), Appendix B2.1.20 (One-Time Inspection Program), and Appendix B2.1.1 (ISI Program).

Table 3.2.1.A NMP1 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-18011

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.A-03	Components in containment spray (PWR only), standby gas treatment system (BWR only), containment isolation, and emergency core cooling systems	Loss of material due to general corrosion	Plant specific	Yes, plant specific	Consistent with NUREG-1801. Containment isolation valves are evaluated in their respective systems. This row also applies to the NMP1 Reactor Building HVAC System (see Table 3.3.2.A-16) which performs functions comparable to a standby gas treatment system and the NMP1 Radioactive Waste System (see Table 3.3.2.A-14). Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Dampers in the NMP1 Reactor Building HVAC System • Filters/strainers • Flow elements • Flow orifices • Heat exchangers • Pumps • Piping and fittings for the NMP1 Reactor Building HVAC System • Tanks for the NMP1 Radioactive Waste System • Valves (continued on next page)

Table 3.2.1.A NMP1 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-18011

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.A-03 (cont'd)	Components in containment spray (PWR only), standby gas treatment system (BWR only), containment isolation, and emergency core cooling systems	Loss of material due to general corrosion	Plant specific	Yes, plant specific	Further evaluation is documented in Appendix B2.1.1 (ISI Program), Appendix B2.1.10 (Open-Cycle Cooling Water System Program), Appendix B2.1.20 (One-Time Inspection Program), and Appendix B2.1.32 Preventive Maintenance Program.
3.2.1.A-04	Piping, fittings, pumps, and valves in emergency core cooling system	Loss of material due to pitting and crevice corrosion	Water chemistry and one-time inspection	Yes, detection of aging effects is to be further evaluated	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2). For piping, fittings, and valves in the Containment Spray System and valves in the Emergency Cooling System that have an aging effect/ mechanism of loss of material due to pitting and crevice corrosion, NMP1 also credits the ISI Program since these components are currently part of the ISI program. Further evaluation is documented in Appendix B2.1.2 (Water Chemistry Program), Appendix B2.1.20 (One-Time Inspection Program), and Appendix B2.1.1 (ISI Program).

Table 3.2.1.A NMP1 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-18011

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.A-05	Components in containment spray (PWR only), standby gas treatment system (BWR only), containment isolation, and emergency core cooling systems	Loss of material due to pitting and crevice corrosion	Plant specific	Yes, plant specific	Consistent with NUREG-1801. Containment isolation components are evaluated in their respective systems. This row also applies to the NMP1 Radioactive Waste System (see Table 3.3.2.A-14). Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Filters/strainers • Flow elements • Heat exchangers • Pumps • Spray Nozzles • Tanks for the NMP1 Radioactive Waste System • Valves Further evaluation is documented in Appendix B2.1.20 (One-Time Inspection Program), Appendix B2.1.1 (ISI Program), Appendix B2.1.10 (Open-Cycle Cooling Water System Program), and B2.1.32 Preventive Maintenance Program.

Table 3.2.1.A NMP1 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-18011

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.A-06	Containment isolation valves and associated piping	Loss of material due to microbiologically influenced corrosion (MIC)	Plant specific	Yes, plant specific	Not applicable for the NMP1 ESF Systems because this aging effect/mechanism does not exist for these components in the NMP1 ESF systems. Consistent with NUREG-1801 for the NMP1 Radioactive Waste System (see Table 3.3.2.A-15). Additionally, pumps and tanks for the NMP1 Radioactive Waste System are consistent with, but not addressed in, NUREG-1801: Further evaluation is documented in Appendix B2.1.32 (Preventive Maintenance Program).
3.2.1.A-07	Seals in standby gas treatment system	Changes in properties due to elastomer degradation	Plant specific	Yes, plant specific	Consistent with NUREG-1801 for the NMP1 Reactor Building HVAC System (see Table 3.2.2.A-16) which performs functions comparable to a standby gas treatment system. Further evaluation is documented in Appendix B2.1.32 (Preventive Maintenance Program).
3.2.1.A-08	PWR only				
3.2.1.A-09	Drywell and suppression chamber spray system nozzles and flow orifices	Plugging of flow orifice and spray nozzles by general corrosion products	Plant specific	Yes, plant specific	Not applicable because this aging effect/mechanism does not exist for these components in the NMP1 ESF systems.

Table 3.2.1.A NMP1 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-18011

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.A-10	External surface of carbon steel components	Loss of material due to general corrosion	Plant specific	Yes, plant specific	Consistent with NUREG-1801. Additionally, bolting is consistent with, but not addressed in, NUREG-1801. Further evaluation is documented in Appendix B2.1.33 (Systems Walkdown Program).
3.2.1.A-11	Piping and fittings of Cast Austenitic Stainless Steel in emergency core cooling systems	Loss of fracture toughness due to thermal aging embrittlement	Thermal aging embrittlement of Cast Austenitic Stainless Steel	No	Not applicable because there are no cast austenitic stainless steel piping and fittings with this aging effect/mechanism in NMP1 ESF Systems.
3.2.1.A-12	Components serviced by open-cycle cooling system	Loss of material due to general, pitting, and crevice corrosion, MIC, and biofouling; buildup of deposit due to biofouling	Open-cycle cooling water system	No	The applicable NUREG-1801 Volume 2 Items for this row (V.D2.4-a and V.D2.4-b) only address heat exchangers. The heat exchangers for the NMP1 ESF Systems are not serviced by open cycle cooling system.
3.2.1.A-13	Components serviced by closed-cycle cooling system	Loss of material due to general, pitting, and crevice corrosion	Closed-cycle cooling water system	No	Not applicable because there are no NMP1 ESF Systems with components serviced by closed- cycle cooling system.

Table 3.2.1.A NMP1 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-18011

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.A-14	Emergency core cooling system valves and lines to and from high-pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) pump turbines	Wall thinning due to flow-accelerated corrosion	Flow-accelerated corrosion	No	Consistent with NUREG-1801 for NMP1 Emergency Cooling System valves. Additionally, the NMP1 Emergency Cooling System piping with this aging effect/mechanism is consistent with, but not addressed in, NUREG-1801. Not applicable for lines to and from high-pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) pump turbines because these components do not exist at NMP1.
3.2.1.A-15	PWR only				

Table 3.2.1.A NMP1 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-18011

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.A-16	Pumps, valves, piping and fittings in emergency core cooling system	Crack initiation and growth due to SCC and IGSCC	Water chemistry and BWR stress corrosion cracking	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.1 and B2.1.2). NMP1 credits the ASME Section XI Inservice Inspection (ISI) (Subsections IWB, IWC, IWD) Program (Appendix B2.1.1) in lieu of the BWR SCC program for stainless steel piping, fittings, and valves in the NMP1 Core Spray System and Emergency Cooling System. These valves, piping, and fittings are currently part of the ISI program and this program, along with the Water Chemistry program, adequately manages aging effect for these components. NMP1 credits the One-Time Inspection Program (Appendix B2.1.20) in lieu of the BWR SCC program for small bore valves because the BWR SCC program does not apply to small-bore valves. Not applicable for pumps in emergency core cooling systems because the applicable NUREG-1801 Volume 2 items (V.D2.1-c and V.D2.3-c) only apply to piping, fittings, and valves. Furthermore, there are no NMP1 ESF pumps with this aging effect/mechanism.
3.2.1.A-17	PWR only				

Table 3.2.1.A NMP1 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-18011

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.A-18	Closure bolting in high-pressure or high-temperature systems	Loss of material due to general corrosion; crack initiation and growth due to cyclic loading and/or SCC	Bolting integrity	No	Not applicable, because the environment causing the aging effect/mechanism in the NUREG-1801 Volume 2 item for bolting includes leaking fluid; whereas, the NMP1 environment for bolting does not assume leakage.

Table 3.2.1.B NMP2 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.B-01	Piping, fittings, and valves in emergency core cooling system	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Consistent with NUREG-1801. Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Condensing chambers • Drain Pots • Filters/strainers • Restriction orifices • Valves [Note: the NUREG-1801 Volume 2 Item that addresses valves (i.e., V.D1.4-a), applies to PWRs only] The TLAA is further evaluated in Section 4.3.

Table 3.2.1.B NMP2 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.B-02	Piping, fittings, pumps, and valves in emergency core cooling system	Loss of material due to general corrosion	Water chemistry and one-time inspection	Yes, detection of aging effects is to be further evaluated	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2). Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Drain Pots • Filters/strainers • Flow elements • Heat exchangers • Level elements • Restriction orifices • Temperature elements • Terry turbine Further evaluation is documented in Appendix B2.1.2 (Water Chemistry Program) and Appendix B2.1.20 (One-Time Inspection Program).

Table 3.2.1.B NMP2 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.B-03	Components in containment spray (PWR only), standby gas treatment system (BWR only), containment isolation, and emergency core cooling systems	Loss of material due to general corrosion	Plant specific	Yes, plant specific	Consistent with NUREG-1801. Containment isolation valves are evaluated in their respective systems. Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Blowers • Flow elements • Piping and fittings • Valves Further evaluation is documented in Appendix B2.1.20 (One-Time Inspection Program).
3.2.1.B-04	Piping, fittings, pumps, and valves in emergency core cooling system	Loss of material due to pitting and crevice corrosion	Water chemistry and one-time inspection	Yes, detection of aging effects is to be further evaluated	Not applicable for piping, fittings, pumps, and valves in the NMP2 emergency core cooling systems because they do not have this aging effect/mechanism.

Table 3.2.1.B NMP2 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.B-05	Components in containment spray (PWR only), standby gas treatment system (BWR only), containment isolation, and emergency core cooling systems	Loss of material due to pitting and crevice corrosion	Plant specific	Yes, plant specific	Consistent with NUREG-1801 for containment isolation components that are in the NMP2 Floor and Equipment Drains System (Table 3.3.2.B-14). Other containment isolation components are evaluated in their respective systems. Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Filters/strainers • Hydrogen recombiners • Valves Further evaluation is documented in Appendix B2.1.20 (One-Time Inspection Program) and Appendix B2.1.26 (10 CFR 50 Appendix J Program).
3.2.1.B-06	Containment isolation valves and associated piping	Loss of material due to microbiologically influenced corrosion (MIC)	Plant specific	Yes, plant specific	Not applicable for the NMP2 ESF Systems because this aging effect/mechanism does not exist for these components in the NMP2 ESF systems. Consistent with NUREG-1801 for NMP2 Floor and Equipment Drains System (Table 3.3.2.B-14).
3.2.1.B-07	Seals in standby gas treatment system	Changes in properties due to elastomer degradation	Plant specific	Yes, plant specific	Not applicable because these components do not exist at NMP2.
3.2.1.B-08	PWR only				

Table 3.2.1.B NMP2 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.B-09	Drywell and suppression chamber spray system nozzles and flow orifices	Plugging of flow orifice and spray nozzles by general corrosion products	Plant specific	Yes, plant specific	Not applicable because this aging effect/mechanism does not exist for these components in the NMP2 ESF systems.
3.2.1.B-10	External surface of carbon steel components	Loss of material due to general corrosion	Plant specific	Yes, plant specific	Consistent with NUREG-1801. Further evaluation is documented in Appendix B2.1.33 (Systems Walkdown Program).
3.2.1.B-11	Piping and fittings of Cast Austenitic Stainless Steel in emergency core cooling systems	Loss of fracture toughness due to thermal aging embrittlement	Thermal aging embrittlement of Cast Austenitic Stainless Steel	No	Not applicable because there are no cast austenitic stainless steel piping and fittings with this aging effect/mechanism in NMP2 ESF Systems.
3.2.1.B-12	Components serviced by open-cycle cooling system	Loss of material due to general, pitting, and crevice corrosion, MIC, and biofouling; buildup of deposit due to biofouling	Open-cycle cooling water system	No	Consistent with NUREG-1801.
3.2.1.B-13	Components serviced by closed-cycle cooling system	Loss of material due to general, pitting, and crevice corrosion	Closed-cycle cooling water system	No	Not applicable because there are no NMP2 Engineered Safety Features Systems with components serviced by closed- cycle cooling system.

Table 3.2.1.B NMP2 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.B-14	Emergency core cooling system valves and lines to and from high-pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) pump turbines	Wall thinning due to flow-accelerated corrosion	Flow-accelerated Corrosion	No	Consistent with NUREG-1801 for NMP2 Reactor Core isolation Cooling valves. Additionally, the following components are consistent with, but not addressed in, NUREG-1801: • Filters/strainers • Piping and fittings in a treated water/steam environment Not applicable for lines to and from high-pressure coolant injection (HPCI) pump turbine because NMP2 does not have a HPCI pump turbine.
3.2.1.B-15	PWR only				

Table 3.2.1.B NMP2 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.B-16	Pumps, valves, piping and fittings in emergency core cooling system	Crack initiation and growth due to SCC and IGSCC	Water chemistry and BWR stress corrosion cracking	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.1 and B2.1.2). NMP2 credits the ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program (Appendix B2.1.1) in lieu of the BWR SCC program for stainless steel piping and fittings in the NMP2 Reactor Core Isolation Cooling System. These components are currently part of the ISI program and this program, along with the Water Chemistry program, adequately manages the affects of aging for these components. NMP2 credits the One-Time Inspection Program (Appendix B2.1.20) in lieu of the BWR SCC program for small bore valves and piping because the BWR SCC program does not apply to small-bore valves and piping. Not applicable for pumps in emergency core cooling systems because the applicable NUREG-1801 Volume 2 items (V.D2.1-c and V.D2.3-c) only apply to piping, fittings, and valves. Furthermore, there are no NMP2 ESF pumps with this aging effect/mechanism.
3.2.1.B-17	PWR only				

Table 3.2.1.B NMP2 Summary of Aging Management Programs for the Engineered Safety Features Systems Evaluated in Chapter V of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1.B-18	Closure bolting in high-pressure or high-temperature systems	Loss of material due to general corrosion; crack initiation and growth due to cyclic loading and/or SCC	Bolting integrity	No	Not applicable, because the environment causing the aging effect/mechanism in the NUREG-1801 Volume 2 item for bolting includes leaking fluid; whereas, the NMPNS environment for bolting does not assume leakage.

Table 3.2.2.A-1 Engineered Safety Features Systems
NMP1 Containment Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.A-10	C, 22
		Wrought Austenitic Stainless Steel	Air	None	None			None
Filters/Strainers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program	V.D2.1-e	3.2.1.A-03 3.2.1.A-05	D, 1
						V.D2.5-a	3.2.1.A-03	D, 1
					Open-Cycle Cooling Water System Program	V.D2.5-a	3.2.1.A-03	C, 1
			Raw Water, Low Flow	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	C, 1

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-1 Engineered Safety Features Systems
NMP1 Containment Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Filters/Strainers (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			Q
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program	V.D2.1-e	3.2.1.A-03 3.2.1.A-05	D, 2

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-1 Engineered Safety Features Systems
NMP1 Containment Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Flow Elements (cont'd)	PB	Wrought Austenitic Stainless Steel	Raw Water, Low Flow	Cracking	Open-Cycle Cooling Water System Program			P
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	C, 2
Flow Orifices	FR PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program	V.D2.5-a	3.2.1.A-03	B
					Open-Cycle Cooling Water System Program	V.D2.5-a	3.2.1.A-03	A
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program	V.D2.5-a	3.2.1.A-03	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-1 Engineered Safety Features Systems
NMP1 Containment Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers	HT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program	V.D2.1-e	3.2.1.A-03	D, 3
		Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program	V.D2.1-e	3.2.1.A-03 3.2.1.A-05	D, 3
Nozzles	PB	Cast Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program	V.D2.1-e	3.2.1.A-05	D, 26

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-1 Engineered Safety Features Systems
NMP1 Containment Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.A-10	A, 4
			Air with Moisture or Wetting, temperature < 140°F	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program	V.D2.5-a	3.2.1.A-03	B
			Raw Water	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program	VII.C1.1-a	3.3.1.A-17	E
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.A-02 3.2.1.A-04	E, 5

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-1 Engineered Safety Features Systems
NMP1 Containment Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Pumps	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.5-a	3.3.1.A-17	A
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.2-a	3.2.1.A-02 3.2.1.A-04	B
		Gray Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program			F
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.C2.3-a	3.3.1.A-15	E
					Selective Leaching of Materials Program	VII.C2.3-a	3.3.1.A-29	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-1 Engineered Safety Features Systems
NMP1 Containment Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.A-03 3.2.1.A-05	C, 6
					Open-Cycle Cooling Water System Program	V.D2.1-e	3.2.1.A-03 3.2.1.A-05	C, 6
			Raw Water, Low Flow	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	A
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.A-02 3.2.1.A-04	B
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.A-02 3.2.1.A-04	E, 5

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-1 Engineered Safety Features Systems
NMP1 Containment Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Copper Alloys (Zinc ≤ 15%)	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	Open-Cycle Cooling Water System Program			K
			Raw Water, Low Flow	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	A
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Raw Water, Low Flow	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program	VII.C1.2-a	3.3.1.A-17 3.3.1.A-29	A
		Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	Open-Cycle Cooling Water System Program	V.D2.1-e	3.2.1.A-03 3.2.1.A-05	C, 6
					One-Time Inspection Program	V.D2.1-e	3.2.1.A-03 3.2.1.A-05	C, 6
			Raw Water, Low Flow	Cracking	Open-Cycle Cooling Water System Program			H
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	A
			Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-2 Engineered Safety Features Systems
NMP1 Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.A-10	C, 22
		Wrought Austenitic Stainless Steel	Air	None	None			None
Filters/Strainers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.A-03 3.2.1.A-05	C, 1
		Wrought Austenitic Stainless Steel	Treated Water, Temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program			Q
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.A-03 3.2.1.A-05	C, 2

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-2 Engineered Safety Features Systems
NMP1 Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Flow Orifices	FR PB	Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.A-03	C, 7
			Treated Water, Temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program			Q
					One-Time Inspection Program Water Chemistry Control Program			Q
Heat Exchangers	HT PB	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Lubricating Oil	None	None			None
			Treated Water, Temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Heat Transfer	Preventative Maintenance Program	VII.C1.3-b	3.3.1.A-17	E
				Loss of Material	Selective Leaching of Materials Program	VII.C1.3-a	3.3.1.A-29	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-2 Engineered Safety Features Systems
NMP1 Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.A-10	A, 4
			Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.A-03 3.2.1.A-05	A
			Treated Water, Temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.A-02	B
		Gray Cast Iron	Air	Loss of Material	Systems Walkdown Program			K, 8
		Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.A-05	A
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	V.D2.1-c	3.2.1.A-16	E

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-2 Engineered Safety Features Systems
NMP1 Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Pumps	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.A-03 3.2.1.A-05	C, 9
			Treated Water, Temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.2-a	3.2.1.A-02	B
		Gray Cast Iron	Treated Water, Temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program Selective Leaching of Materials Program Water Chemistry Control Program			F
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	V.D2.1-e	3.2.1.A-03 3.2.1.A-05	D, 6
					One-Time Inspection Program	V.D2.1-e	3.2.1.A-03 3.2.1.A-05	C, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-2 Engineered Safety Features Systems
NMP1 Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Lubricating Oil	None	None			None
			Treated Water, Temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.A-02	B
		Cast Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	V.D2.1-e	3.2.1.A-05	D, 6
			Treated Water, Temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 5, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-2 Engineered Safety Features Systems
NMP1 Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Cast Austenitic Stainless Steel	Treated Water, Temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	V.D2.3-c	3.2.1.A-16	E
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 5, 6
					Fatigue Monitoring Program	V.D2.1-b	3.2.1.A-01	C, 6
		Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.A-05	C, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-2 Engineered Safety Features Systems
NMP1 Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, Temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 5, 6
					One-Time Inspection Program Water Chemistry Control Program	V.D2.3-c	3.2.1.A-16	E, 10
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 5, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-2 Engineered Safety Features Systems
NMP1 Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.A-01	C, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-3 Engineered Safety Features Systems
NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program			G
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			G
Heat Exchangers	HT PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Preventive Maintenance Program Water Chemistry Control Program	IV.C1.4-a	3.1.1.A-09	E, 16
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Preventive Maintenance Program Water Chemistry Control Program	IV.C1.4-a	3.1.1.A-09	E, 16
	PB	Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature ≥ 140°F	Cracking	Preventive Maintenance Program			G
				Loss of Material	Preventive Maintenance Program			G

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-3 Engineered Safety Features Systems
NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, Temperature ≥ 140°F, but < 212°F	Cracking	Preventive Maintenance Program Water Chemistry Control Program	IV.C1.4-a	3.1.1.A-09	E, 16
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Preventive Maintenance Program Water Chemistry Control Program	IV.C1.4-a	3.1.1.A-09	E, 16
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Preventive Maintenance Program Water Chemistry Control Program	IV.C1.4-a	3.1.1.A-09	E, 16
Level Gauges	PB	Glass	Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-3 Engineered Safety Features Systems
NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature <140°F Treated Water, temperature < 140°F, Low Flow Treated Water, temperature ≥ 140°F, but < 212°F Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-3 Engineered Safety Features Systems
NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment (cont'd)	PFASRE	Any	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking Loss of Material	Flow-Accelerated Corrosion Program Systems Walkdown Program Water Chemistry Control Program			J, 25

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-3 Engineered Safety Features Systems
NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.A-10	A, 4
			Air with Moisture or Wetting, temperature ≥ 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.A-03 3.2.1.A-05	A
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.A-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	V.D.2.3-a	3.2.1.A-14	C, 11
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.A-01	A
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.A-02 3.2.1.A-04	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-3 Engineered Safety Features Systems
NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
			Treated Water, Temperature ≥ 140°F, but < 212°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	V.D2.1-c	3.2.1.A-16	E, 12
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.A-01	A
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	V.D2.1-c	3.2.1.A-16	E
			Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	IV.C1.1-f	3.1.1.A-29	E
					Fatigue Monitoring Program	IV.C1.1-h	3.2.1.A-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-3 Engineered Safety Features Systems
NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Tanks	PB	Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Treated Water, temperature < 140°F	None	None			None
Valves	PB	Aluminum alloys containing copper or zinc as the primary alloying elements	Treated Water, temperature < 140°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			F

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-3 Engineered Safety Features Systems
NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature ≥ 140°F	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program	V.D2.1-e	3.2.1.A-03 3.2.1.A-05	D, 6
			Treated Water, temperature < 140°F	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.A-02	E

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-3 Engineered Safety Features Systems
NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.A-02	E
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 6
					Fatigue Monitoring Program	V.D2.1-b	3.2.1.A-01	C, 6
				Loss of Material	Flow-Accelerated Corrosion Program	V.D2.3-a	3.2.1.A-14	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-3 Engineered Safety Features Systems
NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.A-01	C, 6
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.A-02	B
			Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 6
				Loss of Material	Flow-Accelerated Corrosion Program	V.D2.3-a	3.2.1.A-14	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-3 Engineered Safety Features Systems
NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 6
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.A-02 3.2.1.A-04	E

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-3 Engineered Safety Features Systems
NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
			Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 6
					Fatigue Monitoring Program	V.D2.1-b	3.2.1.A-01	C, 6
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	V.D2.3-c	3.2.1.A-16	E
				Loss of Fracture Toughness	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.C1.3-b	3.1.1.A-23	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-3 Engineered Safety Features Systems
NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
			Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 6
					Fatigue Monitoring Program	V.D2.1-b	3.2.1.A-01	C, 6
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	V.D2.3-c	3.2.1.A-16	E

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-3 Engineered Safety Features Systems
NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 6
					Fatigue Monitoring Program	V.D2.1-b	3.2.1.A-01	C, 6
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	V.D2.3-c	3.2.1.A-16	E, 5

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.A-3 Engineered Safety Features Systems
NMP1 Emergency Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-1 Engineered Safety Features Systems
NMP2 Hydrogen Recombiner System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Blowers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.B.1-a	3.2.1.B-03	C, 13
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	Systems Walkdown Program			G
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	Systems Walkdown Program			K
Filters/Strainers	PB	Cast Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.B-05	C, 1
		Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.B-05	C, 1

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-1 Engineered Safety Features Systems
NMP2 Hydrogen Recombiner System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.B.1-a	3.2.1.B-03	C, 2
Hydrogen Recombiners	PB	Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.B-05	C, 14
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.B-03	A
		Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.B-05	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-1 Engineered Safety Features Systems
NMP2 Hydrogen Recombiner System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.B.1-a	3.2.1.B-03	C, 6
		Cast Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.B-05	C, 6
		Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.B-05	C, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-2 Engineered Safety Features Systems
NMP2 High Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	Systems Walkdown Program			G
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program			G
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			G
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	Systems Walkdown Program			K

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-2 Engineered Safety Features Systems
NMP2 High Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting (cont'd)	PB	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Fatigue Monitoring Program			K
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			K
Filter/Strainers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.B-02	D, 1
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-2 Engineered Safety Features Systems
NMP2 High Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	D, 2
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature < 140°F, Low Flow	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.B-10	A, 4
			Air with Moisture or Wetting, temperature ≥ 140°F	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.B-10	A, 4

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-2 Engineered Safety Features Systems
NMP2 High Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	B
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	A
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	B
		Nickel Based Alloys	Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program			F
					One-Time Inspection Program Water Chemistry Control Program			F

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-2 Engineered Safety Features Systems
NMP2 High Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	Systems Walkdown Program			M, 15
			Air with Moisture or Wetting, temperature ≥ 140°F	Cracking	Systems Walkdown Program			M, 15
				Loss of Material	Systems Walkdown Program			F, 15
			Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	A
					One-Time Inspection Program Water Chemistry Control Program	V.D2.1-c	3.2.1.B-16	E, 10

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-2 Engineered Safety Features Systems
NMP2 High Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Pumps	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.2-a	3.2.1.B-02	B
		Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
Restriction Orifices	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 7
					One-Time Inspection Program Water Chemistry Control Program			Q
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.B-02	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-2 Engineered Safety Features Systems
NMP2 High Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 6
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.B-02	B
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 6
					One-Time Inspection Program Water Chemistry Control Program	V.D2.3-c	3.2.1.B-16	E, 10

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-3 Engineered Safety Features Systems
NMP2 Low Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program			G
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			G
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			K
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			K
Filters/Strainers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	D, 1

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-3 Engineered Safety Features Systems
NMP2 Low Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Filters/Strainers (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	D, 2
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-3 Engineered Safety Features Systems
NMP2 Low Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature <140°F Treated Water, temperature < 140°F, Low Flow Treated Water, temperature ≥ 140°F, but < 212°F Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-3 Engineered Safety Features Systems
NMP2 Low Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature ≥ 140°F	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.B-10	A, 4
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	B
			Treated Water, Temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	B
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	A
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-3 Engineered Safety Features Systems
NMP2 Low Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature ≥ 140°F	Cracking	Systems Walkdown Program			M, 15
				Loss of Material	Systems Walkdown Program			F, 15
			Treated Water, temperature < 140°F	None	None			None
			Treated Water, temperature < 140°F, Low Flow	None	None			None
Pumps	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.2-a	3.2.1.B-02	B
		Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-3 Engineered Safety Features Systems
NMP2 Low Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Restriction Orifices	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water, Temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program Water Chemistry Control Program			Q
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 7
					One-Time Inspection Program Water Chemistry Control Program			Q

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-3 Engineered Safety Features Systems
NMP2 Low Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Program	V.D2.3-b	3.2.1.B-02	B
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.B-02	B
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 6
				Loss of Material	Flow-Accelerated Corrosion Program	V.D2.3-a	3.2.1.B-14	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-3 Engineered Safety Features Systems
NMP2 Low Pressure Core Spray System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
			Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water, Temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-c	3.2.1.B-16	E, 10
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 6
					One-Time Inspection Program Water Chemistry Control Program	V.D2.3-c	3.2.1.B-16	E, 10

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-4 Engineered Safety Features Systems
NMP2 Reactor Core Isolation Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Blower	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	V.D2.5-a	3.2.1.B-03	C, 18
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air with Moisture or Wetting, temperature ≥ 140°F	Cracking	Systems Walkdown Program			G
				Loss of Material	Systems Walkdown Program			G
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program			G
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			G
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air with Moisture or Wetting, temperature ≥ 140°F	Cracking	Systems Walkdown Program			K
				Loss of Material	Systems Walkdown Program			K

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-4 Engineered Safety Features Systems
NMP2 Reactor Core Isolation Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting (cont'd)	PB	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Fatigue Monitoring Program			K
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			K
Condensing Chambers	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 17
					One-Time Inspection Program Water Chemistry Control Program			Q

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-4 Engineered Safety Features Systems
NMP2 Reactor Core Isolation Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Drain Pots	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 19
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	D, 19
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 19
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	D, 19
Filters/Strainers	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 1
				Loss of Material	Flow-Accelerated Corrosion Program	V.D2.3-a	3.2.1.B-14	C, 1
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	D 1

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-4 Engineered Safety Features Systems
NMP2 Reactor Core Isolation Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Filters/Strainers (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	D, 2
Heat Exchangers	HT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Lubricating Oil	None	None			None
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature < 140°F	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-4 Engineered Safety Features Systems
NMP2 Reactor Core Isolation Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment (cont'd)	PFASRE	Any	Treated Water or Steam, temperature ≥ 212°F, but < 482°F Treated Water or Steam, temperature ≥ 482°F	Cracking Loss of Material	Flow-Accelerated Corrosion Program Systems Walkdown Program Water Chemistry Control Program			J, 25
Piping and Fittings	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	B
		Polymers	Treated Water, temperature < 140°F	Cracking	Preventive Maintenance Program			F
				Loss of Strength	Preventive Maintenance Program			F

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-4 Engineered Safety Features Systems
NMP2 Reactor Core Isolation Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	NFS	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	A
					One-Time Inspection Program Water Chemistry Control Program	V.D2.1-c	3.2.1.B-16	E, 10
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	A
					One-Time Inspection Program Water Chemistry Control Program	V.D2.1-c	3.2.1.B-16	E, 10

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-4 Engineered Safety Features Systems
NMP2 Reactor Core Isolation Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature ≥ 140°F	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.B-10	A, 4
			Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	B
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	V.D2.3-a	3.2.1.B-14	C, 11
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	V.D2.3-a	3.2.1.B-14	C, 11
		Nickel Based Alloys	Treated Water, temperature < 140°F	None	None			None
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program			F

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-4 Engineered Safety Features Systems
NMP2 Reactor Core Isolation Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature ≥ 140°F	Cracking	Systems Walkdown Program			M, 15
				Loss of Material	Systems Walkdown Program			F, 15
			Treated Water, temperature < 140°F	None	None			None
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	A
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	V.D2.1-c	3.2.1.B-16	E
					One-Time Inspection Program Water Chemistry Control Program	V.D2.1-c	3.2.1.B-16	E, 10

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-4 Engineered Safety Features Systems
NMP2 Reactor Core Isolation Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	A
					One-Time Inspection Program Water Chemistry Control Program	V.D2.1-c	3.2.1.B-16	E, 10
Pumps	PB	Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.2-a	3.2.1.B-02	B
Restriction Orifices	NFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 7
					One-Time Inspection Program Water Chemistry Control Program			Q

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-4 Engineered Safety Features Systems
NMP2 Reactor Core Isolation Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Restriction Orifices (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 7
					One-Time Inspection Program Water Chemistry Control Program			Q
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 7
					One-Time Inspection Program Water Chemistry Control Program			Q
Rupture Discs	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
Terry Turbine	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.B-02	D, 20

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-4 Engineered Safety Features Systems
NMP2 Reactor Core Isolation Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.B-02	B
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 6
				Loss of Material	Flow-Accelerated Corrosion Program	V.D2.3-a	3.2.1.B-14	A
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.B-02	B
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 6
				Loss of Material	Flow-Accelerated Corrosion Program	V.D2.3-a	3.2.1.B-14	A
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 6
				Loss of Material	Flow-Accelerated Corrosion Program	V.D2.3-a	3.2.1.B-14	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-4 Engineered Safety Features Systems
NMP2 Reactor Core Isolation Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 6
					One-Time Inspection Program Water Chemistry Control Program	V.D2.3-c	3.2.1.B-16	E, 10
				Loss of Fracture Toughness	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.C1.3-b	3.1.1.B-23	B
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 6
					One-Time Inspection Program Water Chemistry Control Program	V.D2.3-c	3.2.1.B-16	E, 10

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-4 Engineered Safety Features Systems
NMP2 Reactor Core Isolation Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 6
					One-Time Inspection Program Water Chemistry Control Program	V.D2.3-c	3.2.1.B-16	E, 10

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-5 Engineered Safety Features Systems
NMP2 Residual Heat Removal System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
"T" Quenchers	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air with Moisture or Wetting, temperature ≥ 140°F	Cracking	Systems Walkdown Program			G
				Loss of Material	Systems Walkdown Program			G
			Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program			G
				Loss of Material	ASME Section XI, Subsections IWB, IWC, & IWD, Inservice Inspection Program			G
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air with Moisture or Wetting, temperature ≥ 140°F	Cracking	Systems Walkdown Program			K
				Loss of Material	Systems Walkdown Program			K

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-5 Engineered Safety Features Systems
NMP2 Residual Heat Removal System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting (cont'd)	PB	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program ASME Section XI, Subsections IWB, IWC, & IWD, Inservice Inspection Program			K
				Loss of Material	ASME Section XI, Subsections IWB, IWC, & IWD, Inservice Inspection Program			K
Condensing Chambers	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-5 Engineered Safety Features Systems
NMP2 Residual Heat Removal System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Filters/Strainers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	D, 1
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	D, 2
Heat Exchangers	HT PB	Wrought Austenitic Stainless Steel	Raw Water, Low Flow	Cracking	Open-Cycle Cooling Water System Program			H
				Loss of Heat Transfer	Open-Cycle Cooling Water System Program	V.D2.4-b	3.2.1.B-12	A
				Loss of Material	Open-Cycle Cooling Water System Program	V.D2.4-a	3.2.1.B-12	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-5 Engineered Safety Features Systems
NMP2 Residual Heat Removal System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers (cont'd)	HT PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water, Low Flow	Loss of Material	Open-Cycle Cooling Water System Program	V.D2.4-a	3.2.1.B-12	A
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.B-02	D, 3
Level Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	D, 23
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-5 Engineered Safety Features Systems
NMP2 Residual Heat Removal System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature ≥ 140°F	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.B-10	A, 4
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	B
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	B
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	A
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-5 Engineered Safety Features Systems
NMP2 Residual Heat Removal System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature ≥ 140°F	Cracking	Systems Walkdown Program			M, 15
				Loss of Material	Systems Walkdown Program			F, 15
			Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	A
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	V.D2.1-c	3.2.1.B-16	E
Pumps	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.2-a	3.2.1.B-02	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-5 Engineered Safety Features Systems
NMP2 Residual Heat Removal System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Pumps	PB	Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
Restriction Orifices	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	D, 7
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 7
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program			Q

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-5 Engineered Safety Features Systems
NMP2 Residual Heat Removal System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Temperature Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	D, 24
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.B-02	B
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 6
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.B-02	B
		Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-5 Engineered Safety Features Systems
NMP2 Residual Heat Removal System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	V.D2.1-b	3.2.1.B-01	C, 6
					One-Time Inspection Program Water Chemistry Control Program	V.D2.3-c	3.2.1.B-16	E, 10

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-6 Engineered Safety Features Systems
NMP2 Standby Gas Treatment System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Blower	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.B.1-a	3.2.1.B-03	C, 21
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	Systems Walkdown Program			G
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	Systems Walkdown Program			K
Filters/Strainers	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.B.2-a	3.2.1.B-03	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-6 Engineered Safety Features Systems
NMP2 Standby Gas Treatment System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.B.1-a	3.2.1.B-03	C, 2
Heaters	PB	Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program			Q
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.B-10	A, 4
			Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.B.1-a	3.2.1.B-03	C, 11
		Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program			J
Restriction Orifices	PB	Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-6 Engineered Safety Features Systems
NMP2 Standby Gas Treatment System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Tanks	PB	Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program			J
Valves	PB	Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program			J
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program	V.B.1-a	3.2.1.B-03	C, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.2.2.B-6 Engineered Safety Features Systems
NMP2 Standby Gas Treatment System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air with Moisture or Wetting, temperature < 140°F	None	None			None
		Wrought Austenitic Stainless Steel	Air with Moisture or Wetting, temperature < 140°F	Loss of Material	One-Time Inspection Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Notes for Tables 3.2.2.A-1 through 3.2.2.B-6:

A. Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

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

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

D. Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.

E. Consistent with NUREG-1801 for material, environment, and aging effect, but a different aging management program is credited.

F. Material not in NUREG-1801 for this component.

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

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

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

J. Neither the component nor the material and environment combination is evaluated in NUREG-1801.

K. Material and environment not in NUREG-1801 for this component and aging effect.

L. Aging effect and environment not in NUREG-1801 for this component and material.

M. Aging effect and material not in NUREG-1801 for this component and environment.

N. Aging effect, material, and environment not in NUREG-1801 for this component.

P. Component and aging effect not in NUREG-1801 for this material and environment.

Q. Component not in NUREG-1801 for this material, environment, and aging effect.

(Note “O” was not used to avoid confusion with the number zero)

Plant Specific Notes:

1. Filters/strainers are not identified in NUREG-1801 for this GALL row number.

2. Flow elements are not identified in NUREG-1801 for this GALL row number.

3. Heat Exchangers are not identified in NUREG-1801 for this GALL row number.

4. This row applies to the external surfaces of carbon steel components.

5. This row applies to small-bore valves and piping that are included in the Inservice Inspection Testing program.

6. Valves are not identified in NUREG-1801 for this GALL row number.

7. Orifices are not identified in NUREG-1801 for this GALL row number.

8. This row applies to the external surfaces of cast iron components.

9. Pumps are not identified in NUREG-1801 for this GALL row number.

10. This row applies to small-bore valves and piping that are not included in the Inservice Inspection Testing program

11. Piping and fittings are not identified in NUREG-1801 for this GALL row number.

12. This row applies to the Condensate Return Lines from the Emergency Condensers to the Reactor Recirculating pumps suction lines.

13. Blowers are not identified in NUREG-1801 for this GALL row number.

14. Hydrogen recombiners are not identified in NUREG-1801 for this GALL row number.

15. This row applies to the external surfaces of stainless steel components.

16. This row applies to the Emergency Cooling heat exchangers. These components are non-Cass 1 components; therefore, the Preventive Maintenance Program is utilized in lieu of the Inservice Inspection Testing program. Additionally, the Water Chemistry Program is credited for these components.

17. Condensing Chambers are not identified in NUREG-1801 for this GALL row number.

18. The Terry Turbine Gland Seal Air Compressor is not identified in NUREG-1801 for this GALL row number.

19. Drain Pots are not identified in NUREG-1801 for this GALL row number.

20. Terry Turbine is not identified in NUREG-1801 for this GALL row number.

21. The Standby Gas Treatment discharge fan is not identified in NUREG-1801 for this GALL row number.

22. Bolting is not identified in NUREG-1801 for this GALL row number.

23. Level elements are not identified in NUREG-1801 for this GALL row number.

24. Temperature elements are not identified in NUREG-1801 for this GALL row number.

25. The Flow Accelerated Corrosion program only applies to the aging effect of loss of material.

26. Nozzles are not identified in NUREG-1801 for this GALL row number.

3.3 AGING MANAGEMENT OF AUXILIARY SYSTEMS

3.3.1 INTRODUCTION

This section provides the results of the aging management review for those components identified in Section 2.3.3, Auxiliary Systems, as being subject to aging management review. The systems, or portions of systems, which are addressed in this section, are described in the indicated sections.

NMP1

- NMP1 Circulating Water System (Section 2.3.3.A.2)
- NMP1 City Water System (Section 2.3.3.A.3)
- NMP1 Compressed Air Systems (Section 2.3.3.A.4)
- NMP1 Containment Systems (Section 2.3.3.A.5)
- NMP1 Control Room HVAC System (Section 2.3.3.A.6)
- NMP1 Diesel Generator Building Ventilation System (Section 2.3.3.A.7)
- NMP1 Emergency Diesel Generator System (Section 2.3.3.A.8)
- NMP1 Fire Detection and Protection System (Section 2.3.3.A.9)
- NMP1 Hydrogen Water Chemistry System (Section 2.3.3.A.10)
- NMP1 Liquid Poison System (Section 2.3.3.A.11)
- NMP1 Miscellaneous Non Contaminated Vents and Drains System (Section 2.3.3.A.12)
- NMP1 Neutron Monitoring System (Section 2.3.3.A.13)
- NMP1 Radioactive Waste Disposal Building HVAC System (Section 2.3.3.A.15)
- NMP1 Radioactive Waste System (Section 2.3.3.A.16)
- NMP1 Reactor Building Closed Loop Cooling Water System (Section 2.3.3.A.17)

- NMP1 Reactor Building HVAC System (Section 2.3.3.A.18)
- NMP1 Reactor Water Cleanup System (Section 2.3.3.A.19)
- NMP1 Sampling System (Section 2.3.3.A.20)
- NMP1 Service Water System (Section 2.3.3.A.21)
- NMP1 Shutdown Cooling System (Section 2.3.3.A.22)
- NMP1 Spent Fuel Pool Filtering and Cooling System (Section 2.3.3.A.23)
- NMP1 Turbine Building Closed Loop Cooling Water System (Section 2.3.3.A.25)
- NMP1 Turbine Building HVAC System (Section 2.3.3.A.26)

NMP2

- NMP2 Air Startup - Standby Diesel Generator System (Section 2.3.3.B.1)
- NMP2 Alternate Decay Heat Removal System (Section 2.3.3.B.2)
- NMP2 Auxiliary Service Building HVAC System (Section 2.3.3.B.3)
- NMP2 Chilled Water Ventilation System (Section 2.3.3.B.4)
- NMP2 Compressed Air Systems (Section 2.3.3.B.5)
- NMP2 Containment Atmosphere Monitoring System (Section 2.3.3.B.6)
- NMP2 Containment Leakage Monitoring System (Section 2.3.3.B.7)
- NMP2 Control Building Chilled Water System (Section 2.3.3.B.8)
- NMP2 Control Building HVAC System (Section 2.3.3.B.9)
- NMP2 Diesel Generator Building Ventilation System (Section 2.3.3.B.10)
- NMP2 Domestic Water System (Section 2.3.3.B.11)
- NMP2 Engine-Driven Fire Pump Fuel Oil System (Section 2.3.3.B.12)

- NMP2 Fire Detection and Protection System (Section 2.3.3.B.13)
- NMP2 Floor and Equipment Drains System (Section 2.3.3.B.14)
- NMP2 Generator Standby Lube Oil System (Section 2.3.3.B.15)
- NMP2 Glycol Heating System (Section 2.3.3.B.16)
- NMP2 Hot Water Heating System (Section 2.3.3.B.17)
- NMP2 Makeup Water System (Section 2.3.3.B.18)
- NMP2 Neutron Monitoring System (Section 2.3.3.B.19)
- NMP2 Primary Containment Purge System (Section 2.3.3.B.20)
- NMP2 Process Sampling System (Section 2.3.3.B.21)
- NMP2 Reactor Building Closed Loop Cooling Water System (Section 2.3.3.B.23)
- NMP2 Reactor Building HVAC System (Section 2.3.3.B.24)
- NMP2 Reactor Water Cleanup System (Section 2.3.3.B.25)
- NMP2 Seal Water System (Section 2.3.3.B.26)
- NMP2 Service Water System (Section 2.3.3.B.27)
- NMP2 Spent Fuel Pool Cooling and Cleanup System (Section 2.3.3.B.28)
- NMP2 Standby Diesel Generator Fuel Oil System (Section 2.3.3.B.29)
- NMP2 Standby Diesel Generator Protection (Generator) System (Section 2.3.3.B.30)
- NMP2 Standby Liquid Control System (Section 2.3.3.B.31)
- NMP2 Yard Structures Ventilation System (Section 2.3.3.B.32)

Tables 3.3.1.A, NMP1 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801, and 3.3.1.B, NMP2 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801, provide the summary of the programs evaluated in NUREG-1801 for the Auxiliary Systems component groups that are relied on for license renewal.

These tables use the format described in Section 3.0. Note that these tables only include results for those component groups that are applicable to a BWR.

3.3.2 RESULTS

The following tables summarize the results of the aging management review for systems in the Auxiliary Systems group.

NMP1

- Table 3.3.2.A-1 Auxiliary Systems - NMP1 Circulating Water System – Summary of Aging Management Evaluation
- Table 3.3.2.A-2 Auxiliary Systems - NMP1 City Water System – Summary of Aging Management Evaluation
- Table 3.3.2.A-3 Auxiliary Systems - NMP1 Compressed Air Systems - Summary of Aging Management Evaluation
- Table 3.3.2.A-4 Auxiliary Systems - NMP1 Containment Systems – Summary of Aging Management Evaluation
- Table 3.3.2.A-5 Auxiliary Systems - NMP1 Control Room HVAC System – Summary of Aging Management Evaluation
- Table 3.3.2.A-6 Auxiliary Systems - NMP1 Diesel Generator Building Ventilation System – Summary of Aging Management Evaluation
- Table 3.3.2.A-7 Auxiliary Systems - NMP1 Emergency Diesel Generator System – Summary of Aging Management Evaluation
- Table 3.3.2.A-8 Auxiliary Systems - NMP1 Fire Detection and Protection System – Summary of Aging Management Evaluation
- Table 3.3.2.A-9 Auxiliary Systems - NMP1 Hydrogen Water Chemistry System – Summary of Aging Management Evaluation

- Table 3.3.2.A-10 Auxiliary Systems - NMP1 Liquid Poison System – Summary of Aging Management Evaluation
- Table 3.3.2.A-11 Auxiliary Systems – NMP1 Miscellaneous Non Contaminated Vents and Drains System – Summary of Aging Management Evaluation
- Table 3.3.2.A-12 Auxiliary Systems - NMP1 Neutron Monitoring System – Summary of Aging Management Evaluation
- Table 3.3.2.A-13 Auxiliary Systems - NMP1 Radioactive Waste Disposal Building HVAC System – Summary of Aging Management Evaluation
- Table 3.3.2.A-14 Auxiliary Systems - NMP1 Radioactive Waste System – Summary of Aging Management Evaluation
- Table 3.3.2.A-15 Auxiliary Systems - NMP1 Reactor Building Closed Loop Cooling Water System – Summary of Aging Management Evaluation
- Table 3.3.2.A-16 Auxiliary Systems - NMP1 Reactor Building HVAC System – Summary of Aging Management Evaluation
- Table 3.3.2.A-17 Auxiliary Systems - NMP1 Reactor Water Cleanup System – Summary of Aging Management Evaluation
- Table 3.3.2.A-18 Auxiliary Systems - NMP1 Sampling System – Summary of Aging Management Evaluation
- Table 3.3.2.A-19 Auxiliary Systems - NMP1 Service Water System – Summary of Aging Management Evaluation
- Table 3.3.2.A-20 Auxiliary Systems - NMP1 Shutdown Cooling System – Summary of Aging Management Evaluation
- Table 3.3.2.A-21 Auxiliary Systems - NMP1 Spent Fuel Pool Filtering and Cooling System – Summary of Aging Management Evaluation
- Table 3.3.2.A-22 Auxiliary Systems - NMP1 Turbine Building Closed Loop Cooling Water System – Summary of Aging Management Evaluation
- Table 3.3.2.A-23 Auxiliary Systems - NMP1 Turbine Building HVAC System – Summary of Aging Management Evaluation

NMP2

- Table 3.3.2.B-1 Auxiliary Systems - NMP2 Air Startup Standby Diesel Generator System – Summary of Aging Management Evaluation
- Table 3.3.2.B-2 Auxiliary Systems - NMP2 Alternate Decay Heat Removal System – Summary of Aging Management Evaluation
- Table 3.3.2.B-3 Auxiliary Systems - NMP2 Auxiliary Service Building HVAC System – Summary of Aging Management Evaluation
- Table 3.3.2.B-4 Auxiliary Systems - NMP2 Chilled Water Ventilation System – Summary of Aging Management Evaluation
- Table 3.3.2.B-5 Auxiliary Systems -NMP2 Compressed Air Systems – Summary of Aging Management Evaluation
- Table 3.3.2.B-6 Auxiliary Systems -NMP2 Containment Atmosphere Monitoring System – Summary of Aging Management Evaluation
- Table 3.3.2.B-7 Auxiliary Systems - NMP2 Containment Leakage Monitoring System – Summary of Aging Management Evaluation
- Table 3.3.2.B-8 Auxiliary Systems - NMP2 Control Building Chilled Water System – Summary of Aging Management Evaluation
- Table 3.3.2.B-9 Auxiliary Systems - NMP2 Control Building HVAC System – Summary of Aging Management Evaluation
- Table 3.3.2.B-10 Auxiliary Systems - NMP2 Diesel Generator Building Ventilation System – Summary of Aging Management Evaluation
- Table 3.3.2.B-11 Auxiliary Systems - NMP2 Domestic Water System – Summary of Aging Management Evaluation
- Table 3.3.2.B-12 Auxiliary Systems - NMP2 Engine-Driven Fire Pump Fuel Oil System – Summary of Aging Management Evaluation
- Table 3.3.2.B-13 Auxiliary Systems -NMP2 Fire Detection and Protection System – Summary of Aging Management Evaluation
- Table 3.3.2.B-14 Auxiliary Systems - NMP2 Floor and Equipment Drains System – Summary of Aging Management Evaluation

- Table 3.3.2.B-15 Auxiliary Systems - NMP2 Generator Standby Lube Oil System – Summary of Aging Management Evaluation
- Table 3.3.2.B-16 Auxiliary Systems - NMP2 Glycol Heating System – Summary of Aging Management Evaluation
- Table 3.3.2.B-17 Auxiliary Systems - NMP2 Hot Water Heating System – Summary of Aging Management Evaluation
- Table 3.3.2.B-18 Auxiliary Systems - NMP2 Makeup Water System – Summary of Aging Management Evaluation
- Table 3.3.2.B-19 Auxiliary Systems - NMP2 Neutron Monitoring System – Summary of Aging Management Evaluation
- Table 3.3.2.B-20 Auxiliary Systems - NMP2 Primary Containment Purge System – Summary of Aging Management Evaluation
- Table 3.3.2.B-21 Auxiliary Systems - NMP2 Process Sampling System – Summary of Aging Management Evaluation
- Table 3.3.2.B-22 Auxiliary Systems - NMP2 Reactor Building Closed-Loop Cooling Water System – Summary of Aging Management Evaluation
- Table 3.3.2.B-23 Auxiliary Systems - NMP2 Reactor Building HVAC System – Summary of Aging Management Evaluation
- Table 3.3.2.B-24 Auxiliary Systems - NMP2 Reactor Water Cleanup System – Summary of Aging Management Evaluation
- Table 3.3.2.B-25 Auxiliary Systems - NMP2 Seal Water System – Summary of Aging Management Evaluation
- Table 3.3.2.B-26 Auxiliary Systems - NMP2 Service Water System – Summary of Aging Management Evaluation
- Table 3.3.2.B-27 Auxiliary Systems - NMP2 Spent Fuel Pool Cooling and Cleanup System – Summary of Aging Management Evaluation
- Table 3.3.2.B-28 Auxiliary Systems - NMP2 Standby Diesel Generator Fuel Oil System – Summary of Aging Management Evaluation

- Table 3.3.2.B-29 Auxiliary Systems - NMP2 Standby Diesel Generator Protection (Generator) System – Summary of Aging Management Evaluation

- Table 3.3.2.B-30 Auxiliary Systems - NMP2 Standby Liquid Control System – Summary of Aging Management Evaluation

- Table 3.3.2.B-31 Auxiliary Systems - NMP2 Yard Structures Ventilation System – Summary of Aging Management Evaluation

The materials from which specific components are fabricated, the environments to which components are exposed, the 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.A, NMP1 Materials, Environments, Aging Effects Requiring Management and Aging Management Programs, and Section 3.3.2.B, NMP2 Materials, Environments, Aging Effects Requiring Management and Aging Management Programs:

NMP1

- Section 3.3.2.A.1, NMP1 Circulating Water System

- Section 3.3.2.A.2, NMP1 City Water System

- Section 3.3.2.A.3, NMP1 Compressed Air Systems

- Section 3.3.2.A.4, NMP1 Containment Systems

- Section 3.3.2.A.5, NMP1 Control Room HVAC System

- Section 3.3.2.A.6, NMP1 Diesel Generator Building Ventilation System

- Section 3.3.2.A.7, NMP1 Emergency Diesel Generator System

- Section 3.3.2.A.8, NMP1 Fire Detection and Protection System

- Section 3.3.2.A.9, NMP1 Hydrogen Water Chemistry System

- Section 3.3.2.A.10, NMP1 Liquid Poison System

- Section 3.3.2.A.11, Miscellaneous Non Contaminated Vents and Drains System

- Section 3.3.2.A.12, NMP1 Neutron Monitoring System
- Section 3.3.2.A.13, NMP1 Radioactive Waste Disposal Building HVAC System
- Section 3.3.2.A.14, NMP1 Radioactive Waste System
- Section 3.3.2.A.15, NMP1 Reactor Building Closed Loop Cooling Water System
- Section 3.3.2.A.16, NMP1 Reactor Building HVAC System
- Section 3.3.2.A.17, NMP1 Reactor Water Cleanup System
- Section 3.3.2.A.18, NMP1 Sampling System
- Section 3.3.2.A.19, NMP1 Service Water System
- Section 3.3.2.A.20, NMP1 Shutdown Cooling System
- Section 3.3.2.A.21, NMP1 Spent Fuel Pool Filtering and Cooling System
- Section 3.3.2.A.22, NMP1 Turbine Building Closed Loop Cooling Water System
- Section 3.3.2.A.23, NMP1 Turbine Building HVAC System

NMP2

- Section 3.3.2.B.1, NMP2 Air Startup - Standby Diesel Generator System
- Section 3.3.2.B.2, NMP2 Alternate Decay Heat Removal System
- Section 3.3.2.B.3, NMP2 Auxiliary Service Building HVAC System
- Section 3.3.2.B.4, NMP2 Chilled Water Ventilation System
- Section 3.3.2.B.5, NMP2 Compressed Air Systems
- Section 3.3.2.B.6, NMP2 Containment Atmosphere Monitoring System
- Section 3.3.2.B.7, NMP2 Containment Leakage Monitoring System

- Section 3.3.2.B.8, NMP2 Control Building Chilled Water System
- Section 3.3.2.B.9, NMP2 Control Building HVAC System
- Section 3.3.2.B.10, NMP2 Diesel Generator Building Ventilation System
- Section 3.3.2.B.11, NMP2 Domestic Water System
- Section 3.3.2.B.12, NMP2 Engine-Driven Fire Pump Fuel Oil System
- Section 3.3.2.B.13, NMP2 Fire Detection and Protection System
- Section 3.3.2.B.14, NMP2 Floor and Equipment Drains System
- Section 3.3.2.B.15, NMP2 Generator Standby Lube Oil System
- Section 3.3.2.B.16, NMP2 Glycol Heating System
- Section 3.3.2.B.17, NMP2 Hot Water Heating System
- Section 3.3.2.B.18, NMP2 Makeup Water System
- Section 3.3.2.B.19, NMP2 Neutron Monitoring System
- Section 3.3.2.B.20, NMP2 Primary Containment Purge System
- Section 3.3.2.B.21, NMP2 Process Sampling System
- Section 3.3.2.B.22, NMP2 Reactor Building Closed Loop Cooling Water System
- Section 3.3.2.B.23, NMP2 Reactor Building HVAC System
- Section 3.3.2.B.24, NMP2 Reactor Water Cleanup System
- Section 3.3.2.B.25, NMP2 Seal Water System
- Section 3.3.2.B.26, NMP2 Service Water System
- Section 3.3.2.B.27, NMP2 Spent Fuel Pool Cooling and Cleanup System
- Section 3.3.2.B.28, NMP2 Standby Diesel Generator Fuel Oil System

- Section 3.3.2.B.29, NMP2 Standby Diesel Generator Protection (Generator) System
- Section 3.3.2.B.30, NMP2 Standby Liquid Control System
- Section 3.3.2.B.31, NMP2 Yard Structures Ventilation System

3.3.2.A NMP1 MATERIALS, ENVIRONMENTS, AGING EFFECTS REQUIRING MANAGEMENT AND AGING MANAGEMENT PROGRAMS

3.3.2.A.1 NMP1 CIRCULATING WATER SYSTEM

Materials

The materials of construction for the NMP1 Circulating Water System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Circulating Water System components are exposed to the following environments:

- Air
- Raw Water

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Circulating Water System, require management:

- Cracking
- Loss of Material
- Loss of Strength

Aging Management Program

The following aging management program manages the aging effects for the NMP1 Circulating Water System components:

- Open-Cycle Cooling Water System Program

3.3.2.A.2 NMP1 CITY WATER SYSTEM

Material

The material of construction for the NMP1 City Water System components is:

- Any (this applies to NSR piping, fittings, and equipment)

Environment

The NMP1 City Water System components are exposed to the following environment:

- Demineralized Untreated Water

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 City Water System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management program manages the aging effects for the NMP1 City Water System components:

- Systems Walkdown Program

3.3.2.A.3 NMP1 COMPRESSED AIR SYSTEMS

Materials

The materials of construction for the NMP1 Compressed Air Systems components are:

- Aluminum alloys containing copper or zinc as the primary alloying elements
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Copper Alloys (Zinc ≤ 15%)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Gray Cast Iron
- Polymers
- Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Red Brass - Cold Worked
- Various Metallic Materials
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Compressed Air Systems components are exposed to the following environments:

- Air
- Demineralized Untreated Water
- Demineralized Untreated Water, Low Flow
- Dried Air or Gas

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Compressed Air Systems, require management:

- Cracking
- Hardening and Shrinkage
- Loss of Heat Transfer
- Loss of Material
- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Compressed Air Systems components:

- Compressed Air Monitoring Program
- Selective Leaching of Materials Program
- Systems Walkdown Program

3.3.2.A.4 NMP1 CONTAINMENT SYSTEMS

Materials

The materials of construction for the NMP1 Containment Systems components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Cast Austenitic Stainless Steel
- Copper Alloys (Zinc ≤ 15%)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon

- Wrought Austenitic Stainless Steel

Environments

The NMP1 Containment Systems components are exposed to the following environments:

- Air
- Air, Moisture or Wetting, temperature ≥ 140°F
- Demineralized Untreated Water
- Demineralized Untreated Water, Low Flow
- Dried Air or Gas

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Containment Systems, require management:

- Cracking
- Loss of Heat Transfer
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Containment Systems components:

- 10 CFR 50 Appendix J Program
- Closed-Cycle Cooling Water System Program
- One-Time Inspection Program
- Preventive Maintenance Program
- Systems Walkdown Program

3.3.2.A.5 NMP1 CONTROL ROOM HVAC SYSTEM

Materials

The materials of construction for the NMP1 Control Room HVAC System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Copper Alloys (Zinc ≤ 15%)
- Gray Cast Iron
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Control Room HVAC System components are exposed to the following environments:

- Air
- Demineralized Untreated Water
- Demineralized Untreated Water, Low Flow
- Dried Air or Gas

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Control Room HVAC System, require management:

- Loss of Heat Transfer
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Control Room HVAC System components:

- Closed-Cycle Cooling Water System Program
- One-Time Inspection Program
- Selective Leaching of Materials Program
- Systems Walkdown Program

3.3.2.A.6 NMP1 DIESEL GENERATOR BUILDING VENTILATION SYSTEM

Material

The material of construction for the NMP1 Diesel Generator Building Ventilation System components is:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron

Environment

The NMP1 Diesel Generator Building Ventilation System components are exposed to the following environment:

- Air

Aging Effects Requiring Management

The following aging effect, associated with the NMP1 Diesel Generator Building Ventilation System, requires management:

- Loss of Material

Aging Management Program

The following aging management program manages the aging effect for the NMP1 Diesel Generator Building Ventilation System components:

- Preventive Maintenance Program

3.3.2.A.7 NMP1 EMERGENCY DIESEL GENERATOR SYSTEM

Materials

The materials of construction for the NMP1 Emergency Diesel Generator System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Cast Austenitic Stainless Steel
- Copper Alloys (Zinc ≤ 15%)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Glass
- Gray Cast Iron
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Emergency Diesel Generator System components are exposed to the following environments:

- Air
- Exhaust
- Fuel Oil
- Fuel Oil without Water Contamination
- Lubricating Oil
- Raw Water
- Soil, below the water table
- Treated Water, temperature <140°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Emergency Diesel Generator System, require management:

- Cracking
- Loss of Heat Transfer
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Emergency Diesel Generator System components:

- Buried Piping and Tanks Inspection Program
- Closed-Cycle Cooling Water System Program
- Fuel Oil Chemistry Program
- One-Time Inspection Program
- Open-Cycle Cooling Water System Program
- Preventive Maintenance Program
- Selective Leaching of Materials Program
- Systems Walkdown Program

3.3.2.A.8 NMP1 FIRE DETECTION AND PROTECTION SYSTEM

Materials

The materials of construction for the NMP1 Fire Detection and Protection System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Concrete
- Copper Alloys (Zinc ≤ 15%)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Gray Cast Iron
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Fire Detection and Protection System components are exposed to the following environments:

- Air
- Dried Air or Gas
- Exhaust
- Fuel Oil without Water Contamination
- Lubricating Oil
- Raw Water, Low Flow
- Soil, above the water table
- Soil, below the water table

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Fire Detection and Protection System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Fire Detection and Protection System components:

- Fire Water System Program
- One-Time Inspection Program
- Preventive Maintenance Program
- Selective Leaching of Materials Program
- Systems Walkdown Program

3.3.2.A.9 NMP1 HYDROGEN WATER CHEMISTRY SYSTEM

Material

The material of construction for the NMP1 Hydrogen Water Chemistry System components is:

- Any (this applies to NSR piping, fittings, and equipment)

Environments

The NMP1 Hydrogen Water Chemistry System components are exposed to the following environments:

- Treated Water, temperature <140°F
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Hydrogen Water Chemistry System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Hydrogen Water Chemistry System components:

- Flow-Accelerated Corrosion Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.3.2.A.10 NMP1 LIQUID POISON SYSTEM

Materials

The materials of construction for the NMP1 Liquid Poison System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Cast Austenitic Stainless Steel
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Liquid Poison System components are exposed to the following environments:

- Dried Air or Gas
- Sodium Pentaborate Solution
- Treated Water, temperature <140°F

- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Liquid Poison System, require management:

- Cracking
- Loss of Fracture Toughness
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Liquid Poison System components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- One-Time Inspection Program
- Water Chemistry Control Program

3.3.2.A.11 NMP1 MISCELLANEOUS NON CONTAMINATED VENTS AND DRAINS SYSTEM

Material

The material of construction for the NMP1 Miscellaneous Non Contaminated Vents and Drains System components is:

- Any (this applies to NSR piping, fittings, and equipment)

Environments

The NMP1 Miscellaneous Non Contaminated Vents and Drains System components are exposed to the following environments:

- Demineralized Untreated Water
- Raw Water

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Miscellaneous Non Contaminated Vents and Drains System, require management:

- Cracking
- Loss of Material

Aging Management Program

The following aging management program manages the aging effects for the NMP1 Miscellaneous Non Contaminated Vents and Drains System components:

- Systems Walkdown Program

3.3.2.A.12 NMP1 NEUTRON MONITORING SYSTEM

Materials

The materials of construction for the NMP1 Neutron Monitoring System components are:

- Aluminum alloys containing copper or zinc as the primary alloying elements
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Neutron Monitoring System components are exposed to the following environments:

- Air
- Dried Air or Gas

Aging Effect Requiring Management

The following aging effect, associated with the NMP1 Neutron Monitoring System, requires management:

- Loss of Material

Aging Management Program

The following aging management program manages the aging effect for the NMP1 Neutron Monitoring System components:

- Systems Walkdown Program

3.3.2.A.13 NMP1 RADIOACTIVE WASTE DISPOSAL BUILDING HVAC SYSTEM

Material

The material of construction for the NMP1 Radioactive Waste Disposal Building HVAC System components is:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron

Environments

The NMP1 Radioactive Waste Disposal Building HVAC System components are exposed to the following environments:

- Air

- Air, Moisture or Wetting, temperature <140°F

Aging Effect Requiring Management

The following aging effect, associated with the NMP1 Radioactive Waste Disposal Building HVAC System, requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effect for the NMP1 Radioactive Waste Disposal Building HVAC System components:

- Preventive Maintenance Program
- Systems Walkdown Program

3.3.2.A.14 NMP1 RADIOACTIVE WASTE SYSTEM

Materials

The materials of construction for the NMP1 Radioactive Waste System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Copper Alloys (Zinc ≤ 15%)
- Gray Cast Iron
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Radioactive Waste System components are exposed to the following environments:

- Air
- Demineralized Untreated Water, Low Flow
- Raw Water, Low Flow
- Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Radioactive Waste System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Radioactive Waste System components:

- Preventive Maintenance Program
- Selective Leaching of Materials Program
- Systems Walkdown Program

3.3.2.A.15 NMP1 REACTOR BUILDING CLOSED LOOP COOLING WATER SYSTEM

Materials

The materials of construction for the NMP1 Reactor Building Closed Loop Cooling Water System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Copper Alloys (Zinc ≤ 15%)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Gray Cast Iron
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Reactor Building Closed Loop Cooling Water System components are exposed to the following environments:

- Air
- Demineralized Untreated Water
- Demineralized Untreated Water, Low Flow
- Lubricating Oil
- Raw Water
- Raw Water, Low Flow
- Treated Water, temperature <140°F
- Treated Water or Steam, temperature ≥ 482°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Reactor Building Closed Loop Cooling Water System, require management:

- Cracking
- Loss of Heat Transfer
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the Reactor Building Closed Loop Cooling Water System components:

- BWR Reactor Water Cleanup System Program
- Closed-Cycle Cooling Water System Program
- Fatigue Monitoring Program
- One-Time Inspection Program

- Open-Cycle Cooling Water System Program
- Selective Leaching of Materials Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.3.2.A.16 NMP1 REACTOR BUILDING HVAC SYSTEM

Materials

The materials of construction for the NMP1 Reactor Building HVAC System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Gray Cast Iron
- Polymers

Environments

The NMP1 Reactor Building HVAC System components are exposed to the following environments:

- Air
- Air, Moisture or Wetting, temperature <140°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Reactor Building HVAC System, require management:

- Cracking
- Hardening and Shrinkage
- Loss of Material

- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Reactor Building HVAC System components:

- One-Time Inspection Program
- Preventive Maintenance Program
- Systems Walkdown Program

3.3.2.A.17 NMP1 REACTOR WATER CLEANUP SYSTEM

Materials

The materials of construction for the NMP1 Reactor Water Cleanup System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Reactor Water Cleanup System components are exposed to the following environments:

- Air
- Demineralized Untreated Water
- Demineralized Untreated Water, Low Flow
- Treated Water, temperature <140°F

- Treated Water, temperature < 140°F, Low Flow
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow
- Treated Water or Steam, temperature ≥ 482°F
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Reactor Water Cleanup System, require management:

- Cracking
- Loss of Fracture Toughness
- Loss of Heat Transfer
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Reactor Water Cleanup System components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- BWR Reactor Water Cleanup System Program
- Closed-Cycle Cooling Water System Program
- Fatigue Monitoring Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Preventive Maintenance Program
- Systems Walkdown Program

- Water Chemistry Control Program

3.3.2.A.18 NMP1 SAMPLING SYSTEM

Materials

The materials of construction for the NMP1 Sampling System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Nickel Based Alloys
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Sampling System components are exposed to the following environments:

- Demineralized Untreated Water
- Treated Water, temperature <140°F
- Treated Water, temperature < 140°F, Low Flow
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Sampling System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Sampling System components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program

- Fatigue Monitoring Program
- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.3.2.A.19 NMP1 SERVICE WATER SYSTEM

Materials

The materials of construction for the NMP1 Service Water System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Copper Alloys (Zinc ≤ 15%)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Gray Cast Iron
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Service Water System components are exposed to the following environments:

- Air
- Raw Water

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Service Water System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Service Water System components:

- Open-Cycle Cooling Water System Program
- Selective Leaching of Materials Program
- Systems Walkdown Program

3.3.2.A.20 NMP1 SHUTDOWN COOLING SYSTEM

Materials

The materials of construction for the NMP1 Shutdown Cooling System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and
- Cast Austenitic Stainless Steel
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Shutdown Cooling System components are exposed to the following environments:

- Air
- Treated Water, temperature <140°F

- Treated Water or Steam, temperature ≥ 482°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Shutdown Cooling System, require management:

- Cracking
- Loss of Fracture Toughness
- Loss of Heat Transfer
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Shutdown Cooling System components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- Closed-Cycle Cooling Water System Program
- Fatigue Monitoring Program
- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.3.2.A.21 NMP1 SPENT FUEL POOL FILTERING AND COOLING SYSTEM

Materials

The materials of construction for the NMP1 Spent Fuel Pool Filtering and Cooling System components are:

- Aluminum alloys containing copper or zinc as the primary alloying elements
- Any (this applies to NSR piping, fittings, and equipment)

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Cast Austenitic Stainless Steel
- Copper Alloys (Zinc ≤ 15%)
- Gray Cast Iron
- Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Spent Fuel Pool Filtering and Cooling System components are exposed to the following environments:

- Air
- Demineralized Untreated Water
- Dried Air or Gas
- Treated Water, temperature <140°F
- Treated Water, temperature <140°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Spent Fuel Pool Filtering and Cooling System, require management:

- Cracking
- Loss of Heat Transfer
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Spent Fuel Pool Filtering and Cooling System components:

- Closed-Cycle Cooling Water System Program
- One-Time Inspection Program
- Preventive Maintenance Program
- Selective Leaching of Materials Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.3.2.A.22 NMP1 TURBINE BUILDING CLOSED LOOP COOLING WATER SYSTEM

Material

The material of construction for the NMP1 Turbine Building Closed Loop Cooling Water System components is:

- Any (this applies to NSR piping, fittings, and equipment)

Environment

The NMP1 Turbine Building Closed Loop Cooling Water System components are exposed to the following environment:

- Demineralized Untreated Water, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Turbine Building Closed Loop Cooling Water System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effect for the NMP1 Turbine Building Closed Loop Cooling Water System components:

- Closed-Cycle Cooling Water System Program
- Systems Walkdown Program

3.3.2.A.23 NMP1 TURBINE BUILDING HVAC SYSTEM

Materials

The materials of construction for the NMP1 Turbine Building HVAC System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Gray Cast Iron
- Polymers
- Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon

Environments

The NMP1 Turbine Building HVAC System components are exposed to the following environments:

- Air
- Air with Vibratory Motion

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Turbine Building HVAC System, require management:

- Cracking
- Hardening and Shrinkage

- Loss of Material
- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Turbine Building HVAC System components:

- One-Time Inspection Program
- Preventive Maintenance Program
- Systems Walkdown Program

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3.3.2.B NMP2 MATERIALS, ENVIRONMENTS, AGING EFFECTS REQUIRING MANAGEMENT AND AGING MANAGEMENT PROGRAMS

3.3.2.B.1 NMP2 AIR STARTUP - STANDBY DIESEL GENERATOR SYSTEM

Materials

The materials of construction for the NMP2 Air Startup - Standby Diesel Generator System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Cast Austenitic Stainless Steel
- Nickel Based Alloys
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Air Startup - Standby Diesel Generator System components are exposed to the following environments:

- Air
- Exhaust

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Air Startup - Standby Diesel Generator System, requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effect for the NMP2 Air Startup - Standby Diesel Generator System components:

- Preventive Maintenance Program
- Systems Walkdown Program

3.3.2.B.2 NMP2 ALTERNATE DECAY HEAT REMOVAL SYSTEM

Materials

The materials of construction for the NMP2 Alternate Decay Heat Removal System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)

Environments

The NMP2 Alternate Decay Heat Removal System components are exposed to the following environments:

- Air
- Raw Water

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Alternate Decay Heat Removal System, requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effect for the NMP2 Alternate Decay Heat Removal System components:

- Open-Cycle Cooling Water System Program
- Systems Walkdown Program

3.3.2.B.3 NMP2 AUXILIARY SERVICE BUILDING HVAC SYSTEM

Materials

The material of construction for the NMP2 Auxiliary Service Building HVAC System components is:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron

Environments

The NMP2 Auxiliary Service Building HVAC System components are exposed to the following environments:

- Air
- Air, Moisture or Wetting, temperature <140°F

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Auxiliary Service Building HVAC System, requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effect for the NMP2 Auxiliary Service Building HVAC System components:

- One-Time Inspection Program
- Systems Walkdown Program

3.3.2.B.4 NMP2 CHILLED WATER VENTILATION SYSTEM

Material

The material of construction for the NMP2 Chilled Water Ventilation System components is:

- Any (this applies to NSR piping, fittings, and equipment)

Environment

The NMP2 Chilled Water Ventilation System components are exposed to the following environment:

- Treated Water, temperature <140°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Chilled Water Ventilation System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Chilled Water Ventilation System components:

- Open-Cycle Cooling Water System Program
- Systems Walkdown Program

3.3.2.B.5 NMP2 COMPRESSED AIR SYSTEMS

Materials

The materials of construction for the NMP2 Compressed Air Systems components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Cast Austenitic Stainless Steel
- Copper Alloys (Zinc ≤ 15%)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels
- Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Various Metallic Materials
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Compressed Air Systems components are exposed to the following environments:

- Air
- Dried Air or Gas

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Compressed Air Systems, requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effect for the NMP2 Compressed Air Systems components:

- 10 CFR 50 Appendix J Program
- Systems Walkdown Program

3.3.2.B.6 NMP2 CONTAINMENT ATMOSPHERE MONITORING SYSTEM

Materials

The materials of construction for the NMP2 Containment Atmosphere Monitoring System components are:

- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Containment Atmosphere Monitoring System components are exposed to the following environments:

- Air, Moisture or Wetting, temperature <140°F
- Air, Moisture or Wetting, temperature ≥ 140°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Containment Atmosphere Monitoring System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Containment Atmosphere Monitoring System components:

- One-Time Inspection Program

- Systems Walkdown Program

3.3.2.B.7 NMP2 CONTAINMENT LEAKAGE MONITORING SYSTEM

Material

The material of construction for the NMP2 Containment Leakage Monitoring System components is:

- Wrought Austenitic Stainless Steel

Environment

The NMP2 Containment Leakage Monitoring System components are exposed to the following environment:

- Air

Aging Effects Requiring Management

There are no aging effects associated with the NMP2 Containment Leakage Monitoring System.

Aging Management Programs

Since there are no aging effects associated with the NMP2 Containment Leakage Monitoring System that require management, no aging management programs are required for license renewal for the NMP2 Containment Leakage Monitoring System.

3.3.2.B.8 NMP2 CONTROL BUILDING CHILLED WATER SYSTEM

Materials

The materials of construction for the NMP2 Control Building Chilled Water System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Copper Alloys (Zinc ≤ 15%)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze

- Gray Cast iron
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Control Building Chilled Water System components are exposed to the following environments:

- Air
- Dried Air or Gas
- Lubricating Oil
- Raw Water
- Treated Water, temperature <140°F
- Treated Water, temperature < 140°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Control Building Chilled Water System, require management:

- Cracking
- Loss of Heat Transfer
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Control Building Chilled Water System components:

- Closed-Cycle Cooling Water System Program
- Open-Cycle Cooling Water System Program
- Systems Walkdown Program

3.3.2.B.9 NMP2 CONTROL BUILDING HVAC SYSTEM

Materials

The materials of construction for the NMP2 Control Building HVAC System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Copper Alloys (Zinc ≤ 15%)
- Gray Cast Iron
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Control Building HVAC System components are exposed to the following environments:

- Air
- Air, Moisture or Wetting, temperature <140°F
- Demineralized Untreated Water
- Raw Water, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Control Building HVAC System, require management:

- Cracking
- Hardening and Shrinkage
- Loss of Heat Transfer
- Loss of Material

- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Control Building HVAC System components:

- Closed-Cycle Cooling Water System Program
- One-Time Inspection Program
- Preventive Maintenance Program
- Systems Walkdown Program

3.3.2.B.10 NMP2 DIESEL GENERATOR BUILDING VENTILATION SYSTEM

Materials

The materials of construction for the NMP2 Diesel Generator Building Ventilation System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Copper Alloys (Zinc ≤ 15%)
- Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon

Environments

The NMP2 Diesel Generator Building Ventilation System components are exposed to the following environments:

- Air
- Air, Moisture or Wetting, temperature <140°F
- Raw Water

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Diesel Generator Building Ventilation System, requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effect for the NMP2 Diesel Generator Building Ventilation System components:

- Fire Protection Program
- One-Time Inspection Program
- Open-Cycle Cooling Water System Program
- Preventive Maintenance Program
- Systems Walkdown Program

3.3.2.B.11 NMP2 DOMESTIC WATER SYSTEM

Materials

The materials of construction for the NMP2 Domestic Water System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Domestic Water System components are exposed to the following environments:

- Air
- Demineralized Untreated Water

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Domestic Water System, require management:

- Cracking
- Loss of Material

Aging Management Program

The following aging management program manages the aging effects for the NMP2 Domestic Water System components:

- Systems Walkdown Program

3.3.2.B.12 NMP2 ENGINE-DRIVEN FIRE PUMP FUEL OIL SYSTEM

Material

The material of construction for the NMP2 Engine-Driven Fire Pump Fuel Oil System components is:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron

Environments

The NMP2 Engine-Driven Fire Pump Fuel Oil System components are exposed to the following environments:

- Air
- Fuel Oil
- Fuel Oil without Water Contamination

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Engine-Driven Fire Pump Fuel Oil System, requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effect for the NMP2 Engine-Driven Fire Pump Fuel Oil System components:

- Fuel Oil Chemistry Program
- One-Time Inspection Program
- Systems Walkdown Program

3.3.2.B.13 NMP2 FIRE DETECTION AND PROTECTION SYSTEM

Materials

The materials of construction for the NMP2 Fire Detection and Protection System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Copper Alloys (Zinc ≤ 15%)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Gray Cast Iron
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Fire Detection and Protection System components are exposed to the following environments:

- Air
- Air, Moisture or Wetting, temperature <140°F

- Dried Air or Gas
- Exhaust
- Raw Water, Low Flow
- Soil, above the water table
- Soil, below the water table

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Fire Detection and Protection System, require management:

- Cracking
- Hardening and Shrinkage
- Loss of Material
- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Fire Detection and Protection System components:

- Buried Piping and Tanks Inspection Program
- Fire Protection Program
- Fire Water System Program
- Selective Leaching of Materials Program
- Systems Walkdown Program

3.3.2.B.14 NMP2 FLOOR AND EQUIPMENT DRAINS SYSTEM

Materials

The materials of construction for the NMP2 Floor and Equipment Drains System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Floor Drain Materials
- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Floor and Equipment Drains System components are exposed to the following environments:

- Air
- Air, Moisture or Wetting, temperature <140°F
- Air, Moisture or Wetting, temperature ≥ 140°F
- Floor Drains
- Fuel Oil
- Raw Water
- Treated Water, temperature <140°F
- Treated Water, temperature ≥ 140°F, but < 212°F
- Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Floor and Equipment Drains System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Floor and Equipment Drains System components:

- 10 CFR 50 Appendix J Program
- One-Time Inspection Program
- Preventive Maintenance Program
- Systems Walkdown Program

3.3.2.B.15 NMP2 GENERATOR STANDBY LUBE OIL SYSTEM

Materials

The materials of construction for the NMP2 Generator Standby Lube Oil System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Gray Cast Iron
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Generator Standby Lube Oil System components are exposed to the following environments:

- Air
- Lubricating Oil

- Treated Water, temperature ≥ 140°F, but < 212°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Generator Standby Lube Oil System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Generator Standby Lube Oil System components:

- Closed-Cycle Cooling Water System Program
- Systems Walkdown Program

3.3.2.B.16 NMP2 GLYCOL HEATING SYSTEM

Material

The material of construction for the NMP2 Glycol Heating System components is:

- Any (this applies to NSR piping, fittings, and equipment)

Environment

The NMP2 Glycol Heating System components are exposed to the following environment:

- Treated Water, temperature ≥ 140°F, but < 212°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Glycol Heating System, require management:

- Cracking
- Loss of Material

Aging Management Program

The following aging management program manages the aging effects for the NMP2 Glycol Heating System components:

- Systems Walkdown Program

3.3.2.B.17 NMP2 HOT WATER HEATING SYSTEM

Material

The material of construction for the NMP2 Hot Water Heating System components is:

- Any (this applies to NSR piping, fittings, and equipment)

Environments

The NMP2 Hot Water Heating System components are exposed to the following environments:

- Treated Water, temperature ≥ 140°F, but < 212°F
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Hot Water Heating System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Hot Water Heating System components:

- Systems Walkdown Program
- Water Chemistry Control Program

3.3.2.B.18 NMP2 MAKEUP WATER SYSTEM

Material

The material of construction for the NMP2 Makeup Water System components is:

- Any (this applies to NSR piping, fittings, and equipment)

Environment

The NMP2 Makeup Water System components are exposed to the following environment:

- Treated Water, temperature <140°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Makeup Water System, require management:

- Cracking
- Loss of Material

Aging Management Program

The following aging management program manages the aging effects for the NMP2 Makeup Water System components:

- Systems Walkdown Program

3.3.2.B.19 NMP2 NEUTRON MONITORING SYSTEM

Material

The material of construction for the NMP2 Neutron Monitoring System components is:

- Wrought Austenitic Stainless Steel

Environments

The NMP2 Neutron Monitoring System components are exposed to the following environments:

- Dried Air or Gas
- Air

Aging Effects Requiring Management

There are no aging effects associated with the NMP2 Neutron Monitoring System.

Aging Management Programs

Since there are no aging effects associated with the NMP2 Neutron Monitoring System that require management, no aging management programs are required for license renewal for the NMP2 Neutron Monitoring System.

3.3.2.B.20 NMP2 PRIMARY CONTAINMENT PURGE SYSTEM

Materials

The materials of construction for the NMP2 Primary Containment Purge System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Cast Austenitic Stainless Steel
- Wrought Austenitic Stainless Steel

Environment

The NMP2 Primary Containment Purge System components are exposed to the following environment:

- Air, Moisture or Wetting, temperature <140°F

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Primary Containment Purge System, requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effect for the NMP2 Primary Containment Purge System components:

- One-Time Inspection Program
- Systems Walkdown Program

3.3.2.B.21 NMP2 PROCESS SAMPLING SYSTEM

Material

The material of construction for the NMP2 Process Sampling System components is:

- Any (this applies to NSR piping, fittings, and equipment)

Environments

The NMP2 Process Sampling System components are exposed to the following environments:

- Treated Water, temperature <140°F
- Treated Water, temperature ≥ 140°F, but < 212°F
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Process Sampling System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Process Sampling System components:

- Systems Walkdown Program
- Water Chemistry Control Program

3.3.2.B.22 NMP2 REACTOR BUILDING CLOSED LOOP COOLING WATER SYSTEM

Materials

The materials of construction for the NMP2 Reactor Building Closed Loop Cooling Water System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Reactor Building Closed Loop Cooling Water System components are exposed to the following environments:

- Air
- Demineralized Untreated Water
- Demineralized Untreated Water, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Reactor Building Closed Loop Cooling Water System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Reactor Building Closed Loop Cooling Water System components:

- Closed-Cycle Cooling Water System Program
- One-Time Inspection Program
- Systems Walkdown Program

3.3.2.B.23 NMP2 REACTOR BUILDING HVAC SYSTEM

Materials

The materials of construction for the NMP2 Reactor Building HVAC System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Copper Alloys (Zinc ≤ 15%)
- Nickel Based Alloys
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Reactor Building HVAC System components are exposed to the following environments:

- Air
- Raw Water
- Raw Water, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Reactor Building HVAC System, require management:

- Cracking
- Hardening and Shrinkage
- Loss of Heat Transfer
- Loss of Material
- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Reactor Building HVAC System components:

- Fire Protection Program
- One-Time Inspection Program
- Open-Cycle Cooling Water System Program
- Preventive Maintenance Program
- Systems Walkdown Program

3.3.2.B.24 NMP2 REACTOR WATER CLEANUP SYSTEM

Materials

The materials of construction for the NMP2 Reactor Water Cleanup System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)

- Wrought Austenitic Stainless Steel

Environments

The NMP2 Reactor Water Cleanup System components are exposed to the following environments:

- Air
- Treated Water, temperature <140°F
- Treated Water, temperature ≥ 140°F, but < 212°F
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F
- Treated Water or Steam, temperature ≥ 482°F
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Reactor Water Cleanup System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Reactor Water Cleanup System components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- BWR Reactor Water Cleanup System Program
- Fatigue Monitoring Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program

- Systems Walkdown Program
- Water Chemistry Control Program

3.3.2.B.25 NMP2 SEAL WATER SYSTEM

Material

The material of construction for the NMP2 Seal Water System components is:

- Any (this applies to NSR piping, fittings, and equipment)

Environment

The NMP2 Seal Water System components are exposed to the following environment:

- Treated Water, temperature <140°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Seal Water System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Seal Water System components:

- Systems Walkdown Program
- Water Chemistry Control Program

3.3.2.B.26 NMP2 SERVICE WATER SYSTEM

Materials

The materials of construction for the NMP2 Service Water System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Cast Austenitic Stainless Steel
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Service Water System components are exposed to the following environments:

- Air
- Raw Water
- Raw Water, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Service Water System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Service Water System components:

- One-Time Inspection Program

- Open-Cycle Cooling Water System Program
- Systems Walkdown Program

3.3.2.B.27 NMP2 SPENT FUEL POOL COOLING AND CLEANUP SYSTEM

Materials

The materials of construction for the NMP2 Spent Fuel Pool Cooling and Cleanup System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Cast Austenitic Stainless Steel
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Spent Fuel Pool Cooling and Cleanup System components are exposed to the following environments:

- Air
- Demineralized Untreated Water
- Treated Water, temperature <140°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Spent Fuel Pool Cooling and Cleanup System, require management:

- Cracking
- Loss of Heat Transfer
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Spent Fuel Pool Cooling and Cleanup System components:

- Closed-Cycle Cooling Water System Program
- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.3.2.B.28 NMP2 STANDBY DIESEL GENERATOR FUEL OIL SYSTEM

Materials

The materials of construction for the NMP2 Standby Diesel Generator Fuel Oil System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Standby Diesel Generator Fuel Oil System components are exposed to the following environments:

- Air
- Fuel Oil
- Fuel Oil without Water Contamination
- Treated Water, temperature ≥ 140°F, but < 212°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Standby Diesel Generator Fuel Oil System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Standby Diesel Generator Fuel Oil System components:

- Fuel Oil Chemistry Program
- One-Time Inspection Program
- Preventive Maintenance Program
- Systems Walkdown Program

3.3.2.B.29 NMP2 STANDBY DIESEL GENERATOR PROTECTION (GENERATOR) SYSTEM

Materials

The materials of construction for the NMP2 Standby Diesel Generator Protection (Generator) System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Copper Alloys (Zinc ≤ 15%)
- Copper Alloys (Zinc > 15%) and Aluminum Bronze
- Gray Cast Iron
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Standby Diesel Generator Protection (Generator) System components are exposed to the following environments:

- Air
- Exhaust
- Fuel Oil without Water Contamination
- Lubricating Oil
- Raw Water
- Treated Water, temperature ≥ 140°F, but < 212°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Standby Diesel Generator Protection (Generator) System, require management:

- Cracking
- Loss of Heat Transfer
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Standby Diesel Generator Protection (Generator) System components:

- Closed-Cycle Cooling Water System Program
- One-Time Inspection Program
- Open-Cycle Cooling Water System Program
- Selective Leaching of Materials Program
- Systems Walkdown Program

3.3.2.B.30 NMP2 STANDBY LIQUID CONTROL SYSTEM

Materials

The materials of construction for the NMP2 Standby Liquid Control System components are:

- Cast Austenitic Stainless Steel
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Standby Liquid Control System components are exposed to the following environments:

- Air, Moisture or Wetting, temperature <140°F
- Dried Air or Gas
- Sodium Pentaborate Solution
- Treated Water, temperature <140°F
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Standby Liquid Control System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Standby Liquid Control System components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- Fatigue Monitoring Program

- One-Time Inspection Program
- Water Chemistry Control Program

3.3.2.B.31 NMP2 YARD STRUCTURES VENTILATION SYSTEM

Materials

The materials of construction for the NMP2 Yard Structures Ventilation System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Copper Alloys (Zinc ≤ 15%)

Environments

The NMP2 Yard Structures Ventilation System components are exposed to the following environments:

- Air
- Air, Moisture or Wetting, temperature <140°F
- Raw Water

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Yard Structures Ventilation System require management:

- Loss of Heat Transfer
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Yard Structures Ventilation System components:

- Fire Protection Program
- One-Time Inspection Program

- Open-Cycle Cooling Water System Program
- Preventive Maintenance Program
- Systems Walkdown Program

3.3.3 TIME-LIMITED AGING ANALYSES

The Time-Limited Aging Analyses (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 Analysis (Section 4.3)

3.3.4 CONCLUSIONS

The Auxiliary Systems components that are subject to aging management review have been identified in accordance with the requirements of 10 CFR 54.4. The aging management programs selected to manage aging effects for the Auxiliary Systems components are identified in the summary tables and Section 3.3.2. A description of these aging management programs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation. Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the Auxiliary Systems 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.A NMP1 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.A-01	Components in spent fuel pool cooling and cleanup	Loss of material due to general, pitting, and crevice corrosion	Water chemistry and one-time inspection	Yes, detection of aging effects is to be further evaluated	Not applicable for the NMP1 Spent Fuel Pool Filtering and Cooling System for the following reasons: • Stainless steel piping and flow elements in this system have no aging effects • Stainless steel heat exchanger components either have no aging effects or have a different aging effect (loss of heat transfer) • Valves in this system either consist of a different material or have no aging effects • Pumps in this system are evaluated in rows 3.3.1.A-15 and 3.3.1.A-29.
3.3.1.A-02	Linings in spent fuel pool cooling and cleanup system; seals and collars in ventilation systems	Hardening, cracking and loss of strength due to elastomer degradation; loss of material due to wear	Plant specific	Yes, plant specific	Consistent with NUREG-1801 for seals and collars in the NMP1 ventilation systems. Not applicable for the NMP1 Spent Fuel Pool Filtering and Cooling System since elastomer linings do not exist in this system. Further evaluation is documented in Appendix B2.1.32 (Preventive Maintenance Program).

Table 3.3.1.A NMP1 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.A-03	Components in load handling, chemical and volume control system (PWR), and reactor water cleanup and shutdown cooling systems (older BWR)	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Not applicable for the components in load handling systems (i.e., cranes including bridge and trolley) because these components do not have this analysis. Not applicable for the chemical and volume control system because NMP1 is a BWR. For the Reactor Water Cleanup (RWCU) System, the applicable NUREG-1801 Volume II items for this row (VII.E3.1-b and VII.E3.2-b) only address piping and pumps. The NMP1 RWCU System piping with this aging effect/mechanism is consistent with NUREG-1801. The TLAA is further evaluated in Section 4.3. NMP1 RWCU pumps are not in scope for license renewal. For the Shutdown Cooling System (SDC), the applicable NUREG-1801 Volume II item for this row (VII.E4.1-b) only addresses piping and fittings. The NMP1 SDC piping and fittings do not have this aging effect/mechanism. Additionally, heat exchangers and rupture discs are consistent with, but not addressed, in NUREG-1801.

Table 3.3.1.A NMP1 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.A-04	Heat exchangers in reactor water cleanup system (BWR); high pressure pumps in chemical and volume control system (PWR)	Crack initiation and growth due to SCC or cracking	Plant specific	Yes, plant specific	Consistent with NUREG-1801 for stainless steel heat exchanger components. Exceptions to the Aging Management Program are documented in Appendix B2.1.2. Further evaluation is also documented in Appendix B2.1.2 (Water Chemistry Control Program) and B2.1.32 (Preventive Maintenance Program). NMP1 RWCU heat exchanger components with an aging effect/mechanism of cracking due to fatigue are evaluated in row 3.3.1.A-03. Other heat exchanger components either consist of a different material or have no aging effects.

Table 3.3.1.A NMP1 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.A-05	Components in ventilation systems, diesel fuel oil system, and emergency diesel generator systems; external surfaces of carbon steel components	Loss of material due to general, pitting, and crevice corrosion, and MIC	Plant specific	Yes, plant specific	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.11). Additionally, the following components are consistent with, but not addressed, in NUREG-1801: • Bolting • Control Room ventilation heat exchangers • Orifices • Piping and fittings • Stainless steel heat exchanger components • Temperature elements • Valves Further evaluation is documented in Appendix B2.1.11 (Closed-Cycle Cooling Water Program), B2.1.17 (Fire Water System Program), B2.1.20 (One-Time Inspection Program), B2.1.26 (10 CFR 50 Appendix J Program), B2.1.32 (Preventive Maintenance Program), and B2.1.33 (Systems Walkdown Program).
3.3.1.A-06	Components in reactor coolant pump oil collect system of fire protection	Loss of material due to galvanic, general, pitting, and crevice corrosion	One-time inspection	Yes, detection of aging effects is to be further evaluated	Not applicable because NMP1 does not have an oil collection system for its reactor recirculation pumps.

Table 3.3.1.A NMP1 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.A-07	Diesel fuel oil tanks in diesel fuel oil system and emergency diesel generator system	Loss of material due to general, pitting, and crevice corrosion, MIC, and biofouling	Fuel oil chemistry and one-time inspection	Yes, detection of aging effects is to be further evaluated	Consistent with NUREG-1801. Further evaluation is documented in Appendix B2.1.18 (Fuel Oil Chemistry Program) and B2.1.20 (One-Time Inspection Program).
3.3.1.A-08	Piping, pump casing, and valve body and bonnets in shutdown cooling system (older BWR)	Loss of material due to pitting and crevice corrosion	Water chemistry and one-time inspection	Yes, detection of aging effects is to be further evaluated	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2). Further evaluation is documented in Appendix B2.1.2 (Water Chemistry Program) and Appendix B2.1.20 (One-Time Inspection Program).
3.3.1.A-09	PWR only				
3.3.1.A-10	Neutron absorbing sheets in spent fuel storage racks	Reduction of neutron absorbing capacity and loss of material due to general corrosion (Boral, boron steel)	Plant specific	Yes, plant specific	Not applicable because there are no aging effects for these components.
3.3.1.A-11	New fuel rack assembly	Loss of material due to general, pitting, and crevice corrosion	Structures monitoring	No	Not applicable because the new fuel rack assembly is not in scope.
3.3.1.A-12	Neutron absorbing sheets in spent fuel storage racks	Reduction of neutron absorbing capacity due to Boraflex degradation	Boraflex monitoring	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.12).

Table 3.3.1.A NMP1 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.A-13	Spent fuel storage racks and valves in spent fuel pool cooling and cleanup	Crack initiation and growth due to stress corrosion cracking	Water chemistry	No	Not applicable because there is no aging effect/mechanism associated with the NMP1 spent fuel pool storage racks because they are in a low temperature and low flow treated water environment. Not applicable for valves in spent fuel pool cooling and cleanup because the applicable NUREG-1801 Volume II item number (VII.A3.3-b) does not apply to a BWR. Furthermore, the NMP1 Spent Fuel Pool Cooling and Cleanup System valves with this aging effect/mechanism are a different material than those evaluated in NUREG-1801, Volume II, Table VII.A4.
3.3.1.A-14	Closure bolting and external surfaces of carbon steel and low-alloy steel components	Loss of material due to boric acid corrosion	Boric acid corrosion	No	Not applicable because this aging effect/mechanism does not exist at NMP1 for closure bolting and external surfaces of carbon steel and low-alloy steel components.

Table 3.3.1.A NMP1 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.A-15	Components in or serviced by closed-cycle cooling water system	Loss of material due to general, pitting, and crevice corrosion, and MIC	Closed-cycle cooling water system	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.11). Additionally, heat exchangers are consistent with, but not addressed in NUREG-1801. NMP1 credits the One-Time Inspection Program (Appendix B2.1.20), and the Water Chemistry Control Program (Appendix B2.1.2) in lieu of the Closed Cycle Cooling Water Program for managing the aging effect of loss of material for cast iron pumps for the NMP1 Spent Fuel Pool Filtering and Cooling System and the NMP1 Containment Spray System (Table 3.2.2.A-1). These programs are consistent with the aging management programs for other Spent Fuel Pool Filtering and Cooling components, with this aging effect/mechanism, evaluated in Table VII.A4 of NUREG-1801 and for emergency core cooling pumps in Table V.D.2 of NUREG-1801.
3.3.1.A-16	Cranes including bridge and trolleys and rail system in load handling system	Loss of material due to general corrosion and wear	Overhead heavy load and light load handling systems	No	Consistent with NUREG-1801.

Table 3.3.1.A NMP1 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.A-17	Components in or serviced by open-cycle cooling water systems	Loss of material due to general, pitting, crevice, and galvanic corrosion, MIC, and biofouling; buildup of deposit due to biofouling	Open-cycle cooling water system	No	Consistent with NUREG-1801. Additionally, the following components are consistent with, but not addressed in NUREG-1801: • Circulating water gates, traveling screens, and rakes • Containment Spray System raw water filters/strainers (Table 3.2.2.A-1) • Flow elements • Heat exchangers Additionally, for the NMP1 Core Spray System heat exchangers (Table 3.2.2.A-2), NMP1 credits the Preventive Maintenance Program (Appendix B2.1.32) for managing the aging effect/mechanism of buildup of deposit due to biofouling. For carbon steel piping and fittings in the NMP1 Containment Spray System (Table 3.2.2.A-1), NMP1 credits the ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program (Appendix B2.1.1) and the One-Time Inspection Program (Appendix B2.1.20) since these components are already part of the ISI Program.

Table 3.3.1.A NMP1 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.A-18	Buried piping and fittings	Loss of material due to general, pitting, and crevice corrosion, and MIC	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	NMP1 utilizes the Buried Piping and Tanks Inspection Program (Appendix B2.1.22) for managing the aging effect of loss of material for NMP1 Diesel Generator System below ground tanks which are consistent with, but not addressed in NUREG-1801. Further evaluation is provided in Appendix B2.1.22.
3.3.1.A-19	Components in compressed air system	Loss of material due to general and pitting corrosion	Compressed air monitoring	No	Consistent with NUREG-1801. Additionally, the following components are consistent with, but not addressed in NUREG-1801: • Heat Exchangers • Orifices Additionally, the Systems Walkdown Program (Appendix B2.1.33) is credited for mechanical connection bolting for piping in the NMP1 Compressed Air System. The Systems Walkdown Program manages aging effects for systems, components, and equipment (including associated welds and bolting).

Table 3.3.1.A NMP1 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.A-20	Components (doors and barrier penetration seals) and concrete structures in fire protection	Loss of material due to wear; hardening and shrinkage due to weathering	Fire protection	No	Consistent with NUREG-1801. Additionally, fire rated doors for the NMP1 Reactor Building, Radwaste Solidification Storage Building, Waste Disposal Building, and Offgas Building are consistent with, but not addressed in NUREG-1801. Not applicable for concrete structures in fire protection, because the plant-specific environment is not conducive to the listed aging effects. Nonetheless, the specified AMP is implemented for these components.
3.3.1.A-21	Components in water-based fire protection	Loss of material due to general, pitting, crevice, and galvanic corrosion, MIC, and biofouling	Fire water system	No	Consistent with NUREG-1801. Additionally, the following components are consistent with, but not addressed in NUREG-1801: • Heat Exchangers • Orifices & Flow Elements • Sluice Gate for Motor Driven Fire Pump • Spray Nozzles
3.3.1.A-22	Components in diesel fire system	Loss of material due to galvanic, general, pitting, and crevice corrosion	Fire protection and fuel oil chemistry	No	The applicable NUREG-1801 Volume II item for this row (VII.G.8-a) only addresses the diesel-driven fire pump and fuel oil supply line. The NMP1 fire pump is evaluated in row 3.3.1.A-21. The NMP1 fuel oil supply lines do not have this aging effect/mechanism because they are not contaminated with water.

Table 3.3.1.A NMP1 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.A-23	Tanks in diesel fuel oil system	Loss of material due to general, pitting, and crevice corrosion	Aboveground carbon steel tanks	No	Not applicable because the diesel fuel oil tanks at NMP1 are not supported on earthen or concrete foundations. The external surfaces of carbon steel surfaces are evaluated in row 3.3.1.A-05.
3.3.1.A-24	Closure bolting	Loss of material due to general corrosion; crack initiation and growth due to cyclic loading and SCC	Bolting integrity	No	Not applicable, because the environment causing the aging effect/mechanism in the NUREG-1801 Volume 2 item for bolting includes leaking fluid; whereas, the NMP1 environment for bolting does not assume leakage. Closure Bolting is evaluated in row 3.3.1.A-05.
3.3.1.A-25	Components in contact with sodium pentaborate solution in standby liquid control system (BWR)	Crack initiation and growth due to SCC	Water chemistry	No	Not applicable, because there are no aging effects associated with a sodium pentaborate solution in the NMP1 Liquid Poison System.
3.3.1.A-26	Components in reactor water cleanup system	Crack initiation and growth due to SCC and IGSCC	Reactor water cleanup system inspection	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.15). Additionally, NMP1 credits the One-Time Inspection Program (Appendix B2.1.20) and Water Chemistry Program (Appendix B2.1.2) for small bore piping in the NMP1 Sampling System.

Table 3.3.1.A NMP1 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.A-27	Components in shutdown cooling system (older BWR)	Crack initiation and growth due to SCC	BWR stress corrosion cracking and water chemistry	No	The applicable NUREG-1801 Volume II items for this row (VII.E4.1-c and VII.E4.3-a) address stainless steel piping and valves in an oxygenated water environment. There is no aging effect/mechanism associated with the NMP1 Shutdown Cooling System stainless steel piping because it is a in a low temperature, treated water environment. The NMP1 Shutdown Cooling system valves with this aging effect/mechanism are evaluated in row 3.1.1.A-29 because they are part of the reactor coolant pressure boundary.
3.3.1.A-28	Components in shutdown cooling system (older BWR)	Loss of material due to pitting and crevice corrosion, and MIC	Closed-cycle cooling water system	No	Consistent with NUREG-1801 with exceptions (See Appendix B2.1.11).
3.3.1.A-29	Components (aluminum bronze, brass, cast iron, cast steel) in open-cycle and closed-cycle cooling water systems, and ultimate heat sink	Loss of material due to selective leaching	Selective leaching of materials	No	Consistent with NUREG-1801. Additionally, heat exchangers are consistent with, but not addressed in NUREG-1801.

Table 3.3.1.A NMP1 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.A-30	Fire barriers, walls, ceilings, and floors in fire protection	Concrete cracking and spalling due to freeze-thaw, aggressive chemical attack, and reaction with aggregates; loss of material due to corrosion of embedded steel	Fire protection and structures monitoring	No	Not applicable for concrete structures in fire protection, because the plant-specific environment is not conducive to the listed aging effects. Nonetheless, the specified AMPs are implemented for these components.

Table 3.3.1.B NMP2 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.B-01	Components in spent fuel pool cooling and cleanup	Loss of material due to general, pitting, and crevice corrosion	Water chemistry and one-time inspection	Yes, detection of aging effects is to be further evaluated	Not applicable for the NMP2 Spent Fuel Pool Cooling and Cleanup System for the following reasons: • Stainless steel piping, flow elements, and pumps in this system have no aging effects • Stainless steel heat exchanger components either have no aging effects or have a different aging effect (loss of heat transfer) • Stainless steel pumps in this system do not have an aging effect because they are in a low temperature, treated water environment. • Valves in this system either consist of a different material or have no aging effects
3.3.1.B-02	Linings in spent fuel pool cooling and cleanup system; seals and collars in ventilation systems	Hardening, cracking and loss of strength due to elastomer degradation; loss of material due to wear	Plant specific	Yes, plant specific	Consistent with NUREG-1801 for seals and collars in the NMP2 ventilation systems. Not applicable for the NMP2 Spent Fuel Pool Cooling and Cleanup System since elastomer linings do not exist in this system. Further evaluation is documented in Appendix B2.1.32 (Preventive Maintenance Program).

Table 3.3.1.B NMP2 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.B-03	Components in load handling, chemical and volume control system (PWR), and reactor water cleanup and shutdown cooling systems (older BWR)	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Not applicable for the components in load handling systems (i.e., cranes including bridge and trolley) because these components do not have this analysis. Not applicable for the chemical and volume control system because NMP2 is a BWR. For the Reactor Water Cleanup (RWCU) System, the applicable NUREG-1801 Volume II items for this row (VII.E3.1-b and VII.E3.2-b) only address piping and pumps. The NMP2 RWCU System piping with this aging effect/mechanism is evaluated in rows 3.1.1.B-01 and 3.1.1.B-07 since it is part of the reactor coolant pressure boundary. The TLAA is further evaluated in Section 4.3. NMP2 RWCU pumps are not in scope for license renewal. Not applicable, for shutdown cooling systems (older BWR) because NMP2 is a BWR/5 and does not have a shutdown cooling system.
3.3.1.B-04	Heat exchangers in reactor water cleanup system (BWR); high pressure pumps in chemical and volume control system (PWR)	Crack initiation and growth due to SCC or cracking	Plant specific	Yes, plant specific	Not applicable because the heat exchangers for the NMP2 RWCU System are not in scope for license renewal.

Table 3.3.1.B NMP2 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.B-05	Components in ventilation systems, diesel fuel oil system, and emergency diesel generator systems; external surfaces of carbon steel components	Loss of material due to general, pitting, and crevice corrosion, and MIC	Plant specific	Yes, plant specific	Consistent with NUREG-1801. Additionally, the following components are consistent with, but not addressed in NUREG-1801: • Air separators • Bolting • Diesel engine air start motors and starting air lubricators • Filters/strainers • Flow Elements • Hose reel nozzles • Valves • Ventilation piping and fittings Further evaluation is provided in Appendix B2.1.17 (Fire Water System Program), B2.1.20 (One-Time Inspection Program), B2.1.32 (Preventive Maintenance Program), and B2.1.33 (Systems Walkdown Program).
3.3.1.B-06	Components in reactor coolant pump oil collect system of fire protection	Loss of material due to galvanic, general, pitting, and crevice corrosion	One-time inspection	Yes, detection of aging effects is to be further evaluated	Not applicable because NMP2 does not have an oil collection system for its reactor recirculation pumps.
3.3.1.B-07	Diesel fuel oil tanks in diesel fuel oil system and emergency diesel generator system	Loss of material due to general, pitting, and crevice corrosion, MIC, and biofouling	Fuel oil chemistry and one-time inspection	Yes, detection of aging effects is to be further evaluated	Consistent with NUREG-1801. Further evaluation is provided in Appendix B2.1.18 (Fuel Oil Chemistry Program) and Appendix B2.1.20 (One-Time Inspection Program).

Table 3.3.1.B NMP2 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.B-08	Piping, pump casing, and valve body and bonnets in shutdown cooling system (older BWR)	Loss of material due to pitting and crevice corrosion	Water chemistry and one-time inspection	Yes, detection of aging effects is to be further evaluated	Not applicable, because NMP2 is not an older BWR (NMP2 is a BWR/5) and does not have a shutdown cooling system.
3.3.1.B-09	PWR only				
3.3.1.B-10	Neutron absorbing sheets in spent fuel storage racks	Reduction of neutron absorbing capacity and loss of material due to general corrosion (Boral, boron steel)	Plant specific	Yes, plant specific	Not applicable because there are no aging effects for these components.
3.3.1.B-11	New fuel rack assembly	Loss of material due to general, pitting, and crevice corrosion	Structures monitoring	No	Not applicable because the new fuel storage racks for NMP2 are a different material (stainless steel) and there are no aging effects for these components.

Table 3.3.1.B NMP2 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.B-12	Neutron absorbing sheets in spent fuel storage racks	Reduction of neutron absorbing capacity due to Boraflex degradation	Boraflex monitoring	No	Consistent with NUREG-1801.
3.3.1.B-13	Spent fuel storage racks and valves in spent fuel pool cooling and cleanup	Crack initiation and growth due to stress corrosion cracking	Water chemistry	No	Not applicable because there is no aging effect/mechanism associated with the NMP2 spent fuel pool storage racks because they are in a low temperature and low flow treated water environment. Not applicable for valves in spent fuel pool cooling and cleanup because the applicable NUREG-1801 Volume II item number (VII.A3.3-b) does not apply to a BWR. Furthermore, the NMP2 Spent Fuel Pool Cooling and Cleanup System valves do not have this aging effect/mechanism.
3.3.1.B-14	Closure bolting and external surfaces of carbon steel and low-alloy steel components	Loss of material due to boric acid corrosion	Boric acid corrosion	No	Not applicable because this aging effect/mechanism does not exist at NMP2 for closure bolting and external surfaces of carbon steel and low-alloy steel components.

Table 3.3.1.B NMP2 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.B-15	Components in or serviced by closed-cycle cooling water system	Loss of material due to general, pitting, and crevice corrosion, and MIC	Closed-cycle cooling water system	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.11). Additionally, the following components are consistent with, but not addressed in NUREG-1801: • Control Building chillers in a treated water environment • Diesel generator heat exchangers in a treated water environment.
3.3.1.B-16	Cranes including bridge and trolleys and rail system in load handling system	Loss of material due to general corrosion and wear	Overhead heavy load and light load handling systems	No	Consistent with NUREG-1801.

Table 3.3.1.B NMP2 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.B-17	Components in or serviced by open-cycle cooling water systems	Loss of material due to general, pitting, crevice, and galvanic corrosion, MIC, and biofouling; buildup of deposit due to biofouling	Open-cycle cooling water system	No	Consistent with NUREG-1801. Additionally, the following components are consistent with, but not addressed in NUREG-1801: • Flow elements • Stainless steel pumps • Temperature elements Additionally, for the NMP2 Reactor Building carbon steel floor drain lines and valves, the NMP2 Control Building HVAC carbon steel valves, and the NMP2 Floor and Equipment Drains stainless steel flow elements that are in a raw water environment, the One-Time Inspection Program (Appendix B2.1.20) is credited for managing the aging effect of loss of material. For the NMP2 Reactor Building stainless steel floor drain lines and the carbon steel Control Building HVAC piping and fittings, the Preventive Maintenance Program (Appendix B2.1.32) is credited for managing the aging effect of loss of material in raw water environment.

Table 3.3.1.B NMP2 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.B-18	Buried piping and fittings	Loss of material due to general, pitting, and crevice corrosion, and MIC	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	NMP2 utilizes the Buried Piping and Tanks Inspection Program (Appendix B2.1.22) for managing the aging effect of loss of material for NMP2 Fire Protection Detection and Protection below ground piping which are consistent with NUREG-1801. Further evaluation is provided in Appendix B2.1.22.

Table 3.3.1.B NMP2 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.B-19	Components in compressed air system	Loss of material due to general and pitting corrosion	Compressed air monitoring	No	Consistent with NUREG-1801 with the following exceptions: • NMP2 credits the Systems Walkdown Program (Appendix B2.1.33) for managing the aging effect of loss of material for NMP2 Compressed Air System carbon steel bolting in an air environment. • NMP2 credits the 10 CFR 50 Appendix J Program (Appendix B2.1.26) for managing the aging effect of loss of material for NMP2 Compressed Air System carbon steel piping and valves in an air environment. • NMP2 credits the Fire Protection Program (Appendix B2.1.16) or the Fire Water System Program (Appendix B2.1.17) for managing the aging effect of loss of material for NMP2 Fire Detection and Protection System carbon steel piping and valves in an internal air environment.

Table 3.3.1.B NMP2 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.B-20	Components (doors and barrier penetration seals) and concrete structures in fire protection	Loss of material due to wear; hardening and shrinkage due to weathering	Fire protection	No	Consistent with NUREG-1801. Additionally, fire rated doors for the NMP2 Reactor Building, Control Room Building, Essential Yard Structures, Radwaste Building, and Standby Gas Treatment Building are consistent with, but not addressed in NUREG-1801. Not applicable for concrete structures in fire protection, because the plant-specific environment is not conducive to the listed aging effects. Nonetheless, the specified AMP is implemented for these components.

Table 3.3.1.B NMP2 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.B-21	Components in water-based fire protection	Loss of material due to general, pitting, crevice, and galvanic corrosion, MIC, and biofouling	Fire water system	No	Consistent with NUREG-1801. Additionally, the following components are consistent with, but not addressed in NUREG-1801: • Flow elements • Heat exchangers • Manifolds • Orifices • Piping and fittings made of copper alloys • Temperature Indicators Additionally, for fire protection water cast iron pumps, strainers, and valves in a raw water environment, NMP2 credits the Selective Leaching of Materials Program in (Appendix B2.1.21) for managing the aging effect of loss of material due to selective leaching.
3.3.1.B-22	Components in diesel fire system	Loss of material due to galvanic, general, pitting, and crevice corrosion	Fire protection and fuel oil chemistry	No	The applicable NUREG-1801 Volume II item for this row (VII.G.8-a) only addresses the diesel-driven fire pump and fuel oil supply line. The NMP2 fire pump is evaluated in row 3.3.1.B-21. The NMP2 fuel oil supply lines do not have this aging effect/mechanism because they are not contaminated with water.

Table 3.3.1.B NMP2 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.B-23	Tanks in diesel fuel oil system	Loss of material due to general, pitting, and crevice corrosion	Aboveground carbon steel tanks	No	Consistent with NUREG-1801 except that that for the external surface of the NMP diesel fuel oil tanks with this aging effect/mechanism, NMP2 credits the Preventive Maintenance Program. As noted in Appendix B2.1.32, the scope of the program includes tanks and the program activities include visual inspection and examination of surfaces of components for evidence of defects and age-related degradation. Thus, this program adequately manages the aging effect/mechanism for this component.
3.3.1.B-24	Closure bolting	Loss of material due to general corrosion; crack initiation and growth due to cyclic loading and SCC	Bolting integrity	No	Not applicable, because the environment causing the aging effect/mechanism in the NUREG-1801 Volume 2 item for bolting includes leaking fluid; whereas, the NMP2 environment for bolting does not assume leakage. Closure Bolting is evaluated in row 3.3.1.B-05.
3.3.1.B-25	Components in contact with sodium pentaborate solution in standby liquid control system (BWR)	Crack initiation and growth due to SCC	Water chemistry	No	Not applicable, because there are no aging effects associated with a sodium pentaborate solution in the NMP2 Standby Liquid Control System.

Table 3.3.1.B NMP2 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.B-26	Components in reactor water Cleanup system	Crack initiation and growth due to SCC and IGSCC	Reactor water cleanup system inspection	No	Not applicable for the NMP2 RWCU System because the only components with this aging effect/mechanism are piping and fittings which are part of the reactor coolant pressure boundary and are evaluated in row 3.1.1.B-07
3.3.1.B-27	Components in shutdown cooling system (older BWR)	Crack initiation and growth due to SCC	BWR stress corrosion cracking and water chemistry	No	Not applicable, because NMP2 is not an older BWR (NMP2 is a BWR/5) and does not have a shutdown cooling system.
3.3.1.B-28	Components in shutdown cooling system (older BWR)	Loss of material due to pitting and crevice corrosion, and MIC	Closed-cycle cooling water system	No	Not applicable, because NMP2 is not an older BWR (NMP2 is a BWR/5) and does not have a shutdown cooling system.
3.3.1.B-29	Components (aluminum bronze, brass, cast iron, cast steel) in open-cycle and closed-cycle cooling water systems, and ultimate heat sink	Loss of material due to selective leaching	Selective leaching of materials	No	Consistent with NUREG-1801.

Table 3.3.1.B NMP2 Summary of Aging Management Programs for the Auxiliary Systems Evaluated in Chapter VII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1.B-30	Fire barriers, walls, ceilings, and floors in fire protection	Concrete cracking and spalling due to freeze-thaw, aggressive chemical attack, and reaction with aggregates; loss of material due to corrosion of embedded steel	Fire protection and structures monitoring	No	Not applicable for concrete structures in fire protection, because the plant-specific environment is not conducive to the listed aging effects. Nonetheless, the specified AMPs are implemented for these components.

Table 3.3.2.A-1 Auxiliary Systems
NMP1 Circulating Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Circulating Water Gates	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.6-a	3.3.1.A-17	C, 8
Traveling Screens and Rakes	FLT	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Open-Cycle Cooling Water System Program			G
			Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.6-a	3.3.1.A-17	C, 8
		Polymers	Raw Water	Cracking	Open-Cycle Cooling Water System Program			F
				Loss of Strength	Open-Cycle Cooling Water System Program			F
		Wrought Austenitic Stainless Steel	Raw Water	Cracking	Open-Cycle Cooling Water System Program			H
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.6-a	3.3.1.A-17	C, 8

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-2 Auxiliary Systems
NMP1 City Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Demineralized Untreated Water	Cracking Loss of Material	Systems Walkdown Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-3 Auxiliary Systems
NMP1 Compressed – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Air Dryers • Couplings • Flanges • Heads • Nozzles • Piping	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.6-a	3.3.1.A-19	A
Air Receivers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.3-a	3.3.1.A-19	A
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	C, 14
		Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VII.D.1-a	3.3.1.A-19	E

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-3 Auxiliary Systems
NMP1 Compressed – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Drain Traps	PB	Copper Alloys (Zinc ≤ 15%)	Demineralized Untreated Water, Low Flow	Loss of Material	Compressed Air Monitoring Program			K
		Gray Cast Iron	Air	Loss of Material	Compressed Air Monitoring Program			F
			Demineralized Untreated Water, Low Flow	Loss of Material	Compressed Air Monitoring Program Selective Leaching of Materials Program			K
Filters/Strainers	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Dried Air or Gas	None	None			None
		Copper Alloys (Zinc ≤ 15%)	Dried Air or Gas	None	None			None
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-3 Auxiliary Systems
NMP1 Compressed – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Filters/Strainers (cont'd)	FLT PB	Wrought Austenitic Stainless Steel	Air	None	None			None
			Dried Air or Gas	None	None			None
	PB	Wrought Austenitic Stainless Steel	Demineralized Untreated Water, Low Flow	Loss of Material	Compressed Air Monitoring Program			K
Heat Exchangers	HT PB	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	Loss of Heat Transfer	Compressed Air Monitoring Program			J, 9
			Demineralized Untreated Water	Loss of Heat Transfer	Compressed Air Monitoring Program			J
				Loss of Material	Compressed Air Monitoring Program Selective Leaching of Materials Program			J
			Demineralized Untreated Water, Low Flow	Loss of Heat Transfer	Compressed Air Monitoring Program			J
				Loss of Material	Compressed Air Monitoring Program Selective Leaching of Materials Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-3 Auxiliary Systems
NMP1 Compressed – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.1-a	3.3.1.A-19	C, 6
			Demineralized Untreated Water	Loss of Material	Compressed Air Monitoring Program			J
			Demineralized Untreated Water, Low Flow	Loss of Material	Compressed Air Monitoring Program			J
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None
			Demineralized Untreated Water, Low Flow	Loss of Material	Compressed Air Monitoring Program Selective Leaching of Materials Program			J
		Gray Cast Iron	Air	Loss of Material	Compressed Air Monitoring Program			J
			Demineralized Untreated Water	Loss of Material	Compressed Air Monitoring Program Selective Leaching of Materials Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-3 Auxiliary Systems
NMP1 Compressed – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Orifices	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.1-a	3.3.1.A-19	C, 7
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.1-a	3.3.1.A-19	A
					Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	A, 3
			Demineralized Untreated Water, Low Flow	Loss of Material	Compressed Air Monitoring Program			G
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
			Dried Air or Gas	None	None			None
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-3 Auxiliary Systems
NMP1 Compressed – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
		Red Brass - Cold Worked	Air	Cracking	Compressed Air Monitoring Program			M
		Wrought Austenitic Stainless Steel	Air	None	None			None
		Various Metallic Materials	Dried Air or Gas	None	None			None
Regulators	PB	Aluminum alloys containing copper or zinc as the primary alloying elements	Dried Air or Gas	None	None			None
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Dried Air or Gas	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-3 Auxiliary Systems
NMP1 Compressed – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Regulators (cont'd)	PB	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Dried Air or Gas	None	None			None
		Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Dried Air or Gas	None	None			None
		Various Metallic Materials	Dried Air or Gas	None	None			None
Separators	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.5-a	3.3.1.A-19	A
		Gray Cast Iron	Air	Loss of Material	Compressed Air Monitoring Program			F
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Compressed Air Monitoring Program	VII.D.2-a	3.3.1.A-19	A
			Dried Air or Gas	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-3 Auxiliary Systems
NMP1 Compressed – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
			Dried Air or Gas	None	None			None
			Demineralized Untreated Water, Low Flow	Loss of Material	Compressed Air Monitoring Program			K
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None
			Dried Air or Gas	None	None			None
			Demineralized Untreated Water, Low Flow	Loss of Material	Compressed Air Monitoring Program Selective Leaching of Materials Program			K
		Gray Cast Iron	Air	Loss of Material	Compressed Air Monitoring Program			F
		Polymers	Air	Cracking	Compressed Air Monitoring Program			M
				Hardening and Shrinkage	Compressed Air Monitoring Program			M
				Loss of Strength	Compressed Air Monitoring Program			M

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-3 Auxiliary Systems
NMP1 Compressed – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Dried Air or Gas	None	None			None
		Various Metallic Materials	Dried Air or Gas	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
			Dried Air or Gas	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-4 Auxiliary Systems
NMP1 Containment Systems – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	C, 5
Ducting	PB	Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
Filters/Strainers	FLT PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.F3.4-a	3.3.1.A-05	A
			Dried Air or Gas	None	None			None
		Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-4 Auxiliary Systems
NMP1 Containment Systems – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Flame Arresters	PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Dried Air or Gas	None	None			None
		Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Heat Exchangers	HT PB	Copper Alloys (Zinc ≤ 15%)	Air	Loss of Heat Transfer	One-Time Inspection Program			H, 9
			Air, Moisture or Wetting, temperature ≥ 140°F	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program			H, 9
			Demineralized Untreated Water	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program			L, 9

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-4 Auxiliary Systems
NMP1 Containment Systems – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers (cont'd)	PB	Copper Alloys (Zinc ≤ 15%)	Air, Moisture or Wetting, temperature ≥ 140°F	None	None			None
			Demineralized Untreated Water	None	None			None
		Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature ≥ 140°F	Cracking	Closed-Cycle Cooling Water System Program			K
				Loss of Material	Closed-Cycle Cooling Water System Program	VII.F3.4-a	3.3.1.A-05	D, 6
			Dried Air or Gas	None	None			None
Pumps	PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Rupture Discs	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Dried Air or Gas	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-4 Auxiliary Systems
NMP1 Containment Systems – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Rupture Discs (cont'd)		Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Tanks	PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Traps	PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	10 CFR 50 Appendix J Program	VII.F3.4-a	3.3.1.A-05	C, 2
					Preventive Maintenance Program	VII.F3.4-a	3.3.1.A-05	C, 2
					Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	A, 3
			Air, Moisture or Wetting, temperature ≥ 140°F	Loss of Material	Preventive Maintenance Program	VII.F3.4-a	3.3.1.A-05	C, 2
			Dried Air or Gas	None	None			None
			Demineralized Untreated Water, Low Flow	Loss of Material	Preventive Maintenance Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-4 Auxiliary Systems
NMP1 Containment Systems – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Cast Austenitic Stainless Steel	Dried Air or Gas	None	None			None
		Copper Alloys (Zinc ≤ 15%)	Dried Air or Gas	None	None			None
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Dried Air or Gas	None	None			None
		Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Dried Air or Gas	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
			Dried Air or Gas	None	None			None
			Demineralized Untreated Water, Low Flow	Loss of Material	Preventive Maintenance Program			J
Vaporizers	HT PB	Copper Alloys (Zinc ≤ 15%)	Air	Loss of Heat Transfer	One-Time Inspection Program			P
	PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-5 Auxiliary Systems
NMP1 Control Room HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Blowers	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.A-05	A
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.A-05	A
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VII.F1.1-a	3.3.1.A-05	A
Ducting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.A-05	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-5 Auxiliary Systems
NMP1 Control Room HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Expansion Tank	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Demineralized Untreated Water, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program			Q
Filters/Strainers	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F1.4-a	3.3.1.A-05	A
			Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			J
Heat Exchangers	HT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Closed-Cycle Cooling Water System Program	VII.F1.4-a	3.3.1.A-05	D, 6
			Dried Air or Gas	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-5 Auxiliary Systems
NMP1 Control Room HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers (cont'd)	HT PB	Copper Alloys (Zinc ≤ 15%)	Air	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program			H, 9
			Demineralized Untreated Water	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program			L, 9
			Dried Air or Gas	None	None			None
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program			L, 9
			Dried Air or Gas	None	None			None
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			K
			Dried Air or Gas	None	None			None
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
			Demineralized Untreated Water	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-5 Auxiliary Systems
NMP1 Control Room HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.A-05	C, 10
					Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	A, 3
			Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
Pumps	PB	Copper Alloys (Zinc ≤ 15%)	Demineralized Untreated Water	None	None			None
Temperature Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.A-05	C, 17
Valves and Dampers	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.A-05	A, 23

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-5 Auxiliary Systems
NMP1 Control Room HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves and Dampers (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.A-05	A, 23 C, 2
			Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
		Cast Austenitic Stainless Steel	Demineralized Untreated Water	None	None			None
		Copper Alloys (Zinc ≤ 15%)	Demineralized Untreated Water	None	None			None
		Gray Cast Iron	Air	Loss of Material	One-Time Inspection Program			F
			Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program Selective Leaching of Materials Program			K

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-6 Auxiliary Systems
NMP1 Diesel Generator Building Ventilation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Blower	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.F4.1-a	3.3.1.A-05	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-7 Auxiliary Systems
NMP1 Emergency Diesel Generator System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Air Intakes	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.H2.3-a	3.3.1.A-05	A
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	C, 5
Exhausts for Emergency Diesel Generator	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Exhaust	Loss of Material	Preventive Maintenance Program	VII.H2.4-a	3.3.1.A-05	A
Filters/Strainers	FLT PB	Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
			Fuel Oil without Water Contamination	None	None			None
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Lubricating Oil	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-7 Auxiliary Systems
NMP1 Emergency Diesel Generator System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Filters/Strainers (cont'd)	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil without Water Contamination	None	None			None
			Lubricating Oil	None	None			None
		Gray Cast Iron	Air	Loss of Material	One-Time Inspection Program			F
			Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program			F
	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil without Water Contamination	None	None			None
	PB	Copper Alloys (Zinc ≤ 15%)	Fuel Oil without Water Contamination	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-7 Auxiliary Systems
NMP1 Emergency Diesel Generator System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.1-a	3.3.1.A-17	C, 11
Flow Glasses	PB	Glass	Fuel Oil without Water Contamination	None	None			None
			Lubricating Oil	None	None			None
Heat Exchangers	HT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature <140°F	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program			H
				Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.3-a	3.3.1.A-15	D, 6
		Gray Cast Iron	Treated Water, temperature <140°F	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program			H
				Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.3-a	3.3.1.A-15	D, 6
					Selective Leaching of Materials Program	VII.C2.3-a	3.3.1.A-29	C, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-7 Auxiliary Systems
NMP1 Emergency Diesel Generator System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers (cont'd)	HT PB	Wrought Austenitic Stainless Steel	Lubricating Oil	None	None			None
			Raw Water	Cracking	Open-Cycle Cooling Water System Program			M
				Loss of Heat Transfer	Open-Cycle Cooling Water System Program			M
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	C, 6
			Treated Water, temperature <140°F	None	None			None
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Lubricating Oil	None	None			None
			Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.3-a	3.3.1.A-15	D, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-7 Auxiliary Systems
NMP1 Emergency Diesel Generator System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers (cont'd)	PB	Wrought Austenitic Stainless Steel	Lubricating Oil	None	None			None
			Raw Water	Cracking	Open-Cycle Cooling Water System Program			M
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	C, 6
			Treated Water, temperature <140°F	None	None			None
Level Glasses	PB	Glass	Lubricating Oil	None	None			None
			Treated Water, temperature <140°F	None	None			None
Mufflers and Silencers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.H2.3-a	3.3.1.A-05	A
			Exhaust	Loss of Material	Preventive Maintenance Program	VII.H2.4-a	3.3.1.A-05	A
Orifices	FR PB	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Lubricating Oil	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-7 Auxiliary Systems
NMP1 Emergency Diesel Generator System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil without Water Contamination	None	None			None
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.A-05	A
					Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	A, 3
			Lubricating Oil	None	None			None
			Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.1-a	3.3.1.A-17	A
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None
			Fuel Oil without Water Contamination	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-7 Auxiliary Systems
NMP1 Emergency Diesel Generator System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Pumps	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil without Water Contamination	None	None			None
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil without Water Contamination	None	None			None
			Lubricating Oil	None	None			None
			Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.3-a	3.3.1.A-15	B
		Gray Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program			F
Tanks	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil	Loss of Material	Fuel Oil Chemistry Program One-Time Inspection Program	VII.H1.4-a	3.3.1.A-07	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-7 Auxiliary Systems
NMP1 Emergency Diesel Generator System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Tanks (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.H2.2-a	3.3.1.A-05	A
			Fuel Oil	Loss of Material	Fuel Oil Chemistry Program One-Time Inspection Program	VII.H1.4-a	3.3.1.A-07	A
			Soil, below the water table	Loss of Material	Buried Piping and Tanks Inspection Program	VII.H1.1-b	3.3.1.A-18	C, 15
			Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.4-a	3.3.1.A-15	B
Valves	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil without Water Contamination	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-7 Auxiliary Systems
NMP1 Emergency Diesel Generator System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.H2.2-a	3.3.1.A-05	A
			Fuel Oil without Water Contamination	None	None			None
			Lubricating Oil	None	None			None
			Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	A
			Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.2-a	3.3.1.A-15	B
		Cast Austenitic Stainless Steel	Air	None	None			None
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
			Fuel Oil without Water Contamination	None	None			None
			Lubricating Oil	None	None			None
			Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-7 Auxiliary Systems
NMP1 Emergency Diesel Generator System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program	VII.C1.2-a	3.3.1.A-17 3.3.1.A-29	A
		Wrought Austenitic Stainless Steel	Air	None	None			None
			Lubricating Oil	None	None			None
			Raw Water	Cracking	Open-Cycle Cooling Water System Program			H
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	A
			Treated Water, temperature <140°F	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-8 Auxiliary Systems
NMP1 Fire Detection and Protection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	C, 5
Filters/Strainers	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.A-21	A
Fire Hydrants	NFS	Gray Cast Iron	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.A-21	A
					Selective Leaching of Materials Program			H
Flow Elements	NFS	Wrought Austenitic Stainless Steel	Raw Water, Low Flow	Cracking	Fire Water System Program			H
				Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.A-21	C, 11

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-8 Auxiliary Systems
NMP1 Fire Detection and Protection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Gearbox	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Lubricating Oil	None	None			None
Heat Exchangers	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-a	3.3.1.A-21	C, 6
NSR piping, fittings, and equipment	PFASRE	Any	Raw Water, Low Flow	Cracking Loss of Material	Systems Walkdown Program			J
Orifices	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.H2.3-a	3.3.1.A-05	C, 7
			Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-a	3.3.1.A-21	C, 7
		Wrought Austenitic Stainless Steel	Raw Water, Low Flow	Cracking	Fire Water System Program			H
				Loss of Material	Fire Water System Program	VII.G.6-a	3.3.1.A-21	C, 7

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-8 Auxiliary Systems
NMP1 Fire Detection and Protection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.H2.3-a	3.3.1.A-05	A
					Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	A, 3
			Exhaust	Loss of Material	Fire Water System Program Preventive Maintenance Program	VII.H2.4-a	3.3.1.A-05	A
			Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-a	3.3.1.A-21	A
		Copper Alloys (Zinc ≤ 15%)	Fuel Oil without Water Contamination	None	None			None
		Concrete	Soil, above the water table	None	None			None
			Soil, below the water table	None	None			None
			Raw Water, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-8 Auxiliary Systems
NMP1 Fire Detection and Protection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Pumps	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.A-21	A
Silencers	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.H2.3-a	3.3.1.A-05	A
			Exhaust	Loss of Material	Preventive Maintenance Program	VII.H2.4-a	3.3.1.A-05	A
Sluice Gate for Motor Driven Fire Pump	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.A-21	C, 22
Spray Nozzles	NFS	Copper Alloys (Zinc ≤ 15%)	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.A-21	C, 21
Sprinklers	NFS	Copper Alloys (Zinc ≤ 15%)	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.A-21	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-8 Auxiliary Systems
NMP1 Fire Detection and Protection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Tanks and Air Receivers	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.H2.2-a	3.3.1.A-05	A
			Dried Air or Gas	None	None			None
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
Valves	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.H2.2-a	3.3.1.A-05	A
			Dried Air or Gas	None	None			None
			Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.A-21	A
		Copper Alloys (Zinc ≤ 15%)	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.A-21	A
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.A-21	A
					Selective Leaching of Materials Program	VII.C1.2-a	3.3.1.A-29	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-8 Auxiliary Systems
NMP1 Fire Detection and Protection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.A-21	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-9 Auxiliary Systems
NMP1 Hydrogen Water Chemistry System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature <140°F	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking Loss of Material	Flow-Accelerated Corrosion Program Systems Walkdown Program Water Chemistry Control Program			J, 31

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-10 Auxiliary Systems
NMP1 Liquid Poison System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature <140°F	Loss of Material	Water Chemistry Control Program One-Time Inspection Program	V.D2.1-a	3.2.1.A-02	B
		Wrought Austenitic Stainless Steel	Sodium Pentaborate Solution	None	None			None
			Treated Water, temperature <140°F	None	None			None
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	B, 1
Pumps	PB	Wrought Austenitic Stainless Steel	Sodium Pentaborate Solution	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-10 Auxiliary Systems
NMP1 Liquid Poison System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Tanks	PB	Wrought Austenitic Stainless Steel	Sodium Pentaborate Solution	None	None			None
			Treated Water, temperature <140°F	None	None			None
Valves	PB	Cast Austenitic Stainless Steel	Sodium Pentaborate Solution	None	None			None
			Treated Water, temperature <140°F	None	None			None
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 1, 2

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-10 Auxiliary Systems
NMP1 Liquid Poison System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Cast Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Loss of Fracture Toughness	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.C1.3-b	3.1.1.A-23	B
		Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
			Sodium Pentaborate Solution	None	None			None
			Treated Water, temperature <140°F	None	None			None
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 1, 2

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-11 Auxiliary Systems
NMP1 Miscellaneous Non Contaminated Vents and Drains System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Demineralized Untreated Water Raw Water	Cracking Loss of Material	Systems Walkdown Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-12 Auxiliary Systems
NMP1 Neutron Monitoring System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	A, 3
			Dried Air or Gas	None	None			None
		Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Valves	PB	Aluminum alloys containing copper or zinc as the primary alloying elements	Dried Air or Gas	None	None			None
		Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-13 Auxiliary Systems
NMP1 Radioactive WasteSolidification and Storage Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Dampers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	A, 3
			Air, Moisture or Wetting, temperature <140°F	Loss of Material	Preventive Maintenance Program	VII.F2.1-a	3.3.1.A-05	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-14 Auxiliary Systems
NMP1 Radioactive Waste System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.A-10	C, 5
NSR piping, fittings, and equipment	PFASRE	Any	Demineralized Untreated Water, Low Flow Raw Water Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking Loss of Material	Systems Walkdown Program			J
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.A-10	A
			Demineralized Untreated Water, Low Flow	Loss of Material	Preventive Maintenance Program	V.C.1-a	3.2.1.A-03 3.2.1.A-06	A
			Raw Water, Low Flow	Loss of Material	Preventive Maintenance Program	V.C.1-a	3.2.1.A-03 3.2.1.A-05 3.2.1.A-06	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-14 Auxiliary Systems
NMP1 Radioactive Waste System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	Preventive Maintenance Program	V.C.1-a	3.2.1.A-03	A
Pumps	NFS	Gray Cast Iron	Demineralized Untreated Water, Low Flow	Loss of Material	Preventive Maintenance Program Selective Leaching of Materials Program			Q
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water, Low Flow	Loss of Material	Preventive Maintenance Program	V.C.1-b	3.2.1.A-06	C, 16
Tanks	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water, Low Flow	Loss of Material	Preventive Maintenance Program	V.C.1-a	3.2.1.A-03 3.2.1.A-05 3.2.1.A-06	C, 15

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-14 Auxiliary Systems
NMP1 Radioactive Waste System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Demineralized Untreated Water, Low Flow	Loss of Material	Preventive Maintenance Program	V.C.1-a	3.2.1.A-03 3.2.1.A-06	A
			Raw Water, Low Flow	Loss of Material	Preventive Maintenance Program	V.C.1-a	3.2.1.A-03 3.2.1.A-05 3.2.1.A-06	A
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	Preventive Maintenance Program	V.C.1-a	3.2.1.A-03	A
		Copper Alloys (Zinc ≤ 15%)	Demineralized Untreated Water, Low Flow	Loss of Material	Preventive Maintenance Program			F
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water, Low Flow	Loss of Material	Preventive Maintenance Program	V.C.1-b	3.2.1.A-06	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-14 Auxiliary Systems
NMP1 Radioactive Waste System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking	Preventive Maintenance Program			H

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-15 Auxiliary Systems
NMP1 Reactor Building Closed Loop Cooling Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Filters/Strainers	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			J
		Copper Alloys (Zinc ≤ 15%)	Demineralized Untreated Water	None	None			None
		Gray Cast Iron	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program Selective Leaching of Materials Program			J
Flow Elements	PB	Gray Cast Iron	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program Selective Leaching of Materials Program			K

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-15 Auxiliary Systems
NMP1 Reactor Building Closed Loop Cooling Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers	HT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Demineralized Untreated Water	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program One-Time Inspection Program			J
				Loss of Material	Closed-Cycle Cooling Water System Program			J
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Demineralized Untreated Water	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program One-Time Inspection Program			J
				Loss of Material	Closed-Cycle Cooling Water System Program Selective Leaching of Materials Program			J
			Lubricating Oil	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-15 Auxiliary Systems
NMP1 Reactor Building Closed Loop Cooling Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers (cont'd)	HT PB	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Raw Water, Low Flow	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program			J
				Loss of Material	Closed-Cycle Cooling Water System Program Selective Leaching of Materials Program			J
			Treated Water, temperature <140°F	Loss of Heat Transfer	BWR Reactor Water Cleanup System Program One-Time Inspection Program			J, 9
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program One-Time Inspection Program			J, 9

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-15 Auxiliary Systems
NMP1 Reactor Building Closed Loop Cooling Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers (cont'd)	HT PB	Wrought Austenitic Stainless Steel	Raw Water	Cracking	Open-Cycle Cooling Water System Program			M
				Loss of Heat Transfer	Open-Cycle Cooling Water System Program			F
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.4-a	3.3.1.A-17	C, 6
			Treated Water, temperature <140°F	None	None			None
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program			L
					One-Time Inspection Program Water Chemistry Control Program			L

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-15 Auxiliary Systems
NMP1 Reactor Building Closed Loop Cooling Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			J
			Raw Water, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program			J
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water	None	None			None
			Raw Water	Cracking	Open-Cycle Cooling Water System Program			M
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.4-a	3.3.1.A-17	C, 6
NSR piping, fittings, and equipment	PFASRE	Any	Demineralized Untreated Water Demineralized Untreated Water, Low Flow Raw Water	Cracking Loss of Material	Closed-Cycle Cooling Water System Program Systems Walkdown Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-15 Auxiliary Systems
NMP1 Reactor Building Closed Loop Cooling Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment (cont'd)	PFASRE	Any	Raw Water, Low Flow	Cracking Loss of Material	Closed-Cycle Cooling Water System Program Systems Walkdown Program			J
Orifices	FR PB	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	None	None			None
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	A, 3
			Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program			K
Pumps	PB	Gray Cast Iron	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program Selective Leaching of Materials Program			G

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-15 Auxiliary Systems
NMP1 Reactor Building Closed Loop Cooling Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Temperature Elements	PB	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	None	None			None
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
			Demineralized Untreated Water, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program			G
		Copper Alloys (Zinc ≤ 15%)	Demineralized Untreated Water	None	None			None
			Demineralized Untreated Water, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program			K
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program Selective Leaching of Materials Program			K

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-15 Auxiliary Systems
NMP1 Reactor Building Closed Loop Cooling Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Gray Cast Iron	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program Selective Leaching of Materials Program			K
			Demineralized Untreated Water, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program Selective Leaching of Materials Program			K
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-16 Auxiliary Systems
NMP1 Reactor Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Blowers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	V.B.1-a	3.2.1.A-03	A
		Polymers	Air	Cracking	Preventive Maintenance Program	V.B.1-b	3.2.1.A-07	A
				Hardening and Shrinkage	Preventive Maintenance Program	V.B.1-b	3.2.1.A-07	A
				Loss of Strength	Preventive Maintenance Program	V.B.1-b	3.2.1.A-07	A
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	V.B.1-a	3.2.1.A-03	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-16 Auxiliary Systems
NMP1 Reactor Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Ducting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.A-10	A, 12
			Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program	V.B.1-a	3.2.1.A-03	A
Filters	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	V.B.2-a	3.2.1.A-03	A
Flow Elements	PB	Gray Cast Iron	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program			J
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	V.E.1-b	3.2.1.A-10	A, 3
			Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program	V.B.1-a	3.2.1.A-03	C, 10
Temperature Elements	PB	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-16 Auxiliary Systems
NMP1 Reactor Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves and Dampers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	V.B.1-a	3.2.1.A-03	C, 2
			Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program	V.B.1-a	3.2.1.A-03	A, 23

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-17 Auxiliary Systems
NMP1 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	C, 5
Heat Exchangers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Demineralized Untreated Water, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program			N
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program			M
				Loss of Material	Flow-Accelerated Corrosion Program			M
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water	None	None			None
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	VII.E3.1-b	3.3.1.A-03	C, 6
					Preventive Maintenance Program Water Chemistry Control Program	VII.E3.3-d	3.3.1.A-04	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-17 Auxiliary Systems
NMP1 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature <140°F	Cracking Loss of Material	BWR Reactor Water Cleanup System Program Flow-Accelerated Corrosion Program Systems Walkdown Program			J, 31
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	A, 3
			Treated Water, temperature <140°F	Loss of Material	BWR Reactor Water Cleanup System Program			N
		Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	VII.E3.1-b	3.3.1.A-03	A
					BWR Reactor Water Cleanup System Program	VII.E3.1-a	3.3.1.A-26	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-17 Auxiliary Systems
NMP1 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.A-02	B
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.3-c	3.1.1.A-25	A
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 1, 2
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.A-02	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-17 Auxiliary Systems
NMP1 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.A-29	E
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A
			Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.A-29	E
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A
				Loss of Fracture Toughness	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.C1.3-b	3.1.1.A-23	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-17 Auxiliary Systems
NMP1 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Cast Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 1, 2
				Loss of Fracture Toughness	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.C1.3-b	3.1.1.A-23	B
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-17 Auxiliary Systems
NMP1 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 1, 2
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A
					One-Time Inspection Program Water Chemistry Control Program	V.D2.3-c	3.2.1.A-16	E, 29

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-17 Auxiliary Systems
NMP1 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 1, 2
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 1, 2
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-17 Auxiliary Systems
NMP1 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-c	3.2.1.A-16	E, 29

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-18 Auxiliary Systems
NMP1 Sampling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers	PB	Nickel Based Alloys	Demineralized Untreated Water	None	None			None
			Treated Water, temperature < 140°F, Low Flow	None	None			None
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program			F
					One-Time Inspection Program Water Chemistry Control Program			F
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature <140°F Treated Water, temperature < 140°F, Low Flow	Cracking Loss of Material	Water Chemistry Control Program Systems Walkdown Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-18 Auxiliary Systems
NMP1 Sampling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program	VII.E3.1-a	3.3.1.A-26	E
					Fatigue Monitoring Program	VII.E3.1-b	3.3.1.A-03	A
Rupture Disc	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program			Q
					Fatigue Monitoring Program	VII.E3.1-b	3.3.1.A-03	C, 28
Valves	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-18 Auxiliary Systems
NMP1 Sampling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.A-07	D, 1, 2

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-19 Auxiliary Systems
NMP1 Service Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	C, 5
Filters/Strainers	FLT	Gray Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program			F
Flow Elements	PB	Gray Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program			F
NSR piping, fittings, and equipment	PFASRE	Any	Raw Water	Cracking Loss of Material	Open-Cycle Cooling Water System Program Systems Walkdown Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-19 Auxiliary Systems
NMP1 Service Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	A, 3
			Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.1-a	3.3.1.A-17	A
		Gray Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program			F
		Wrought Austenitic Stainless Steel	Raw Water	Cracking	Open-Cycle Cooling Water System Program			H
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.1-a	3.3.1.A-17	A
Pumps	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.5-a	3.3.1.A-17	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-19 Auxiliary Systems
NMP1 Service Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Pumps (cont'd)	PB	Gray Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program			F
Valves	NFS	Copper Alloys (Zinc ≤ 15%)	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	A
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	A
		Copper Alloys (Zinc ≤ 15%)	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	A
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program	VII.C1.2-a	3.3.1.A-17 3.3.1.A-29	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-19 Auxiliary Systems
NMP1 Service Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Gray Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program Selective Leaching of Materials Program			F
		Wrought Austenitic Stainless Steel	Raw Water	Cracking	Open-Cycle Cooling Water System Program			H
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.A-17	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-20 Auxiliary Systems
NMP1 Shutdown Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Flow Elements	NFS	Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
Heat Exchangers	HT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature <140°F	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program			H
				Loss of Material	Closed-Cycle Cooling Water System Program	VII.E4.4-a	3.3.1.A-28	B
		Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature <140°	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-20 Auxiliary Systems
NMP1 Shutdown Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Orifices	FR PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	C, 7
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program			Q
	NFS	Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
Piping and Fittings	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
Pumps	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.E4.2-a	3.3.1.A-08	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-20 Auxiliary Systems
NMP1 Shutdown Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	NFS	Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
		Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	A, 3
		Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
			Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.A-29	E

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-20 Auxiliary Systems
NMP1 Shutdown Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Cast Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A
				Loss of Fracture Toughness	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program	IV.C1.3-b	3.1.1.A-23	B
		Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
			Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.A-29	E
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-21 Auxiliary Systems
NMP1 Spent Fuel Pool Filtering and Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Filters/Strainers	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			F
		Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
Flow Elements	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
Heat Exchangers	HT PB	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program			L, 9
			Treated Water, temperature <140°F	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-21 Auxiliary Systems
NMP1 Spent Fuel Pool Filtering and Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
			Treated Water, temperature <140°F	Loss of Material	Preventive Maintenance Program Water Chemistry Control Program			F
		Copper Alloys (Zinc ≤ 15%)	Demineralized Untreated Water	None	None			None
			Treated Water, temperature <140°F	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-21 Auxiliary Systems
NMP1 Spent Fuel Pool Filtering and Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Demineralized Untreated Water Treated Water, temperature <140°F Treated Water, temperature < 140°F, Low Flow	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	A, 3
		Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-21 Auxiliary Systems
NMP1 Spent Fuel Pool Filtering and Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Pumps	PB	Gray Cast Iron	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VII.C2.3-a	3.3.1.A-15	E
					Selective Leaching of Materials Program	VII.C2.3-a	3.3.1.A-29	A
Tanks	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
Valves	PB	Aluminum alloys containing copper or zinc as the primary alloying elements	Treated Water, temperature <140°F	Cracking	One-Time Inspection Program Water Chemistry Control Program			M
			Treated Water, temperature <140°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program			M

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-21 Auxiliary Systems
NMP1 Spent Fuel Pool Filtering and Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			F
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program			F
		Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
		Copper Alloys (Zinc ≤ 15%)	Treated Water, temperature < 140°F, Low Flow	None	None			None
		Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Treated Water, temperature <140°F	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-21 Auxiliary Systems
NMP1 Spent Fuel Pool Filtering and Cooling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
			Treated Water, temperature <140°F	None	None			None
			Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-22 Auxiliary Systems
NMP1 Turbine Building Closed Loop Cooling Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Demineralized Untreated Water, Low Flow	Cracking Loss of Material	Closed-Cycle Cooling Water System Program Systems Walkdown Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-23 Auxiliary Systems
NMP1 Turbine Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Blowers	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F2.1-a	3.3.1.A-05	A
					Preventive Maintenance Program	VII.F2.1-a	3.3.1.A-05	A
Bolting	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	C, 5
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	C, 5
Ducting	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F2.1-a	3.3.1.A-05	A
					Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	A, 3

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-23 Auxiliary Systems
NMP1 Turbine Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Ducting (cont'd)	NFS	Polymers	Air with Vibratory Motion	Cracking	Preventive Maintenance Program	VII.F2.1-b	3.3.1.A-02	A
				Hardening and Shrinkage	Preventive Maintenance Program	VII.F2.1-b	3.3.1.A-02	A
				Loss of Material	Preventive Maintenance Program	VII.F2.1-c	3.3.1.A-02	A
				Loss of Strength	Preventive Maintenance Program	VII.F2.1-b	3.3.1.A-02	A
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F2.1-a	3.3.1.A-05	A
					Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	A, 3
Muffler	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F2.4-a	3.3.1.A-05	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.A-23 Auxiliary Systems
NMP1 Turbine Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves and Dampers	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F2.1-a	3.3.1.A-05	A, 23
								C, 2
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.F2.1-a	3.3.1.A-05	A, 23
					One-Time Inspection Program	VII.F2.1-a	3.3.1.A-05	C, 2
		Gray Cast Iron	Air	Loss of Material	One-Time Inspection Program			F
Vents	NFS	Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-1 Auxiliary Systems
NMP2 Air Startup Standby Diesel Generator System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Air Separators	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.B-05	C, 20
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	C, 5
Diesel Engine Air Start Motors	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.B-05	C, 19
Filters/Strainers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.H2.3-a	3.3.1.B-05	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-1 Auxiliary Systems
NMP2 Air Startup Standby Diesel Generator System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Mufflers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Exhaust	Loss of Material	Preventive Maintenance Program	VII.H2.4-a	3.3.1.B-05	A
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.B-05	A
					Preventive Maintenance Program Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
		Wrought Austenitic Stainless Steel	Air	None	None			None
			Exhaust	Loss of Material	Preventive Maintenance Program			F
Starting Air Lubricator	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.B-05	C, 19

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-1 Auxiliary Systems
NMP2 Air Startup Standby Diesel Generator System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Tanks	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.B-05	A
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.H2.2-a	3.3.1.B-05	A
		Cast Austenitic Stainless Steel	Air	None	None			None
		Nickel Based Alloys	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
			Exhaust	Loss of Material	Preventive Maintenance Program			F

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-2 Auxiliary Systems
NMP2 Alternate Decay Heat Removal System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	C, 5
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
			Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C3.1-a	3.3.1.B-17	A
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C3.2-a	3.3.1.B-17	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-3 Auxiliary Systems
NMP2 Auxiliary Service Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Fire Dampers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
			Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program	VII.F2.1-a	3.3.1.B-05	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-4 Auxiliary Systems
NMP2 Chilled Water Ventilation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature <140°F	Cracking Loss of Material	Open-Cycle Cooling Water System Program Systems Walkdown Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-5 Auxiliary Systems
NMP2 Compressed Air Systems – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.D.2-a	3.3.1.B-19	E
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	10 CFR 50 Appendix J Program	VII.D.1-a	3.3.1.B-19	E
					Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
			Dried Air or Gas	None	None			None
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
			Dried Air or Gas	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
			Dried Air or Gas	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-5 Auxiliary Systems
NMP2 Compressed Air Systems – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Orifices	FR PB	Various Metallic Materials	Dried Air or Gas	None	None			None
		Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Radiation Collars	RS	Wrought Austenitic Stainless Steel	Air	None	None			None
Tanks and Receivers	PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Rupture Discs	PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Valves	NFS	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Dried Air or Gas	None	None			None
		Various Metallic Materials	Dried Air or Gas	None	None			None
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	10 CFR 50 Appendix J Program	VII.D.2-a	3.3.1.B-19	E
			Dried Air or Gas	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-5 Auxiliary Systems
NMP2 Compressed Air Systems – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Cast Austenitic Stainless Steel	Dried Air or Gas	None	None			None
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Dried Air or Gas	None	None			None
		Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Dried Air or Gas	None	None			None
		Various Metallic Materials	Dried Air or Gas	None	None			None
		Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-6 Auxiliary Systems
NMP2 Containment Atmosphere Monitoring System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air, Moisture or Wetting, temperature ≥ 140°F	Cracking	Systems Walkdown Program			K
				Loss of Material	Systems Walkdown Program			K
Condensing Chambers	PB	Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program			J
Piping and Fittings	PB	Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program			J
					Systems Walkdown Program			J, 13
			Air, Moisture or Wetting, temperature ≥ 140°F	Cracking	One-Time Inspection Program			J
					Systems Walkdown Program			J, 13
				Loss of Material	One-Time Inspection Program			J
					Systems Walkdown Program			J, 13
Pumps	PB	Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature ≥ 140°F	Cracking	One-Time Inspection Program			J
				Loss of Material	One-Time Inspection Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-6 Auxiliary Systems
NMP2 Containment Atmosphere Monitoring System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	PB	Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program			J
			Air, Moisture or Wetting, temperature ≥ 140°F	Cracking	One-Time Inspection Program			J
				Loss of Material	One-Time Inspection Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-7 Auxiliary Systems
NMP2 Containment Leakage Monitoring System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	PB	Wrought Austenitic Stainless Steel	Air	None	None			None
Valves	PB	Wrought Austenitic Stainless Steel	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-8 Auxiliary Systems
NMP2 Control Building Chilled Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Chillers	HT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Dried Air or Gas	None	None			None
			Lubricating Oil	None	None			None
		Copper Alloys (Zinc ≤ 15%)	Dried Air or Gas	None	None			None
			Raw Water	Loss of Heat Transfer	Open-Cycle Cooling Water System Program			M
				Loss of Material	Open-Cycle Cooling Water System Program			F
			Treated Water, temperature <140°F	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program			H, 9
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Dried Air or Gas	None	None			None
			Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.3-a	3.3.1.B-17	A
			Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.4-a	3.3.1.B-15	D, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-8 Auxiliary Systems
NMP2 Control Building Chilled Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Chillers (cont'd)	PB	Gray Cast iron	Dried Air or Gas	None	None			None
Flow Elements	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
NSR piping, fittings, and equipment	PFASRE	Any	Raw Water Treated Water, temperature <140°F Treated Water, temperature < 140°F, Low Flow	Cracking Loss of Material	Open-Cycle Cooling Water System Program Systems Walkdown Program			J
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Closed-Cycle Cooling Water System Program			G
			Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.F1.3-a	3.3.1.B-15	B
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program	VII.F1.3-a	3.3.1.B-15	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-8 Auxiliary Systems
NMP2 Control Building Chilled Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Pumps	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.3-a	3.3.1.B-15	B
		Gray Cast iron	Lubricating Oil	None	None			None
Tanks	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.4-a	3.3.1.B-15	B
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Closed-Cycle Cooling Water System Program			G
			Treated Water, temperature <140°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.2-a	3.3.1.B-15	B
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.2-a	3.3.1.B-15	B
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Dried Air or Gas	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-8 Auxiliary Systems
NMP2 Control Building Chilled Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
			Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-9 Auxiliary Systems
NMP2 Control Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Air Handling Unit	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.B-05	A
Blowers	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.B-05	A
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.B-05	A
Ducting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.B-05	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-9 Auxiliary Systems
NMP2 Control Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Filters/Strainers	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F1.4-a	3.3.1.B-05	A
	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F1.4-a	3.3.1.B-05	A
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.B-05	C, 11
Heat Exchangers	HT PB	Copper Alloys (Zinc ≤ 15%)	Air, Moisture or Wetting, temperature <140°F	Loss of Heat Transfer	Preventive Maintenance Program			H
				Loss of Material	One-Time Inspection Program	VII.F1.2-a	3.3.1.B-05	A
			Demineralized Untreated Water	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program			L, 9

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-9 Auxiliary Systems
NMP2 Control Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.F1.1-a	3.3.1.B-05	C, 10
					Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
			Raw Water, Low Flow	Loss of Material	Preventive Maintenance Program	VII.C1.1-a	3.3.1.B-17	E
		Polymers	Air	Cracking	Preventive Maintenance Program	VII.F1.4-b	3.3.1.B-02	A
				Hardening and Shrinkage	Preventive Maintenance Program	VII.F1.4-b	3.3.1.B-02	A
				Loss of Strength	Preventive Maintenance Program	VII.F1.4-b	3.3.1.B-02	A
Radiation Sample Point	PB	Wrought Austenitic Stainless Steel	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-9 Auxiliary Systems
NMP2 Control Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves and Dampers (includes fire dampers)	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.B-05	A, 23
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F1.1-a	3.3.1.B-05	A, 23 C, 2
			Raw Water, Low Flow	Loss of Material	One-Time Inspection Program	VII.C3.2-a	3.3.1.B-17	E
		Gray Cast Iron	Air	Loss of Material	One-Time Inspection Program			K
		Wrought Austenitic Stainless Steel	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-10 Auxiliary Systems
NMP2 Diesel Generator Building Ventilation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Blowers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.F4.1-a	3.3.1.B-05	A
		Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
Dampers (includes fire dampers)	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Fire Protection Program	VII.F4.1-a	3.3.1.B-05	A, 4
	PB				Preventive Maintenance Program	VII.F4.1-a	3.3.1.B-05	A
Ducting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F4.1-a	3.3.1.B-05	A
					Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-10 Auxiliary Systems
NMP2 Diesel Generator Building Ventilation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Unit Coolers	PB	Copper Alloys (Zinc ≤ 15%)	Air, Moisture or Wetting, temperature <140°F	Loss of Material	Preventive Maintenance Program	VII.F4.2-a	3.3.1.B-05	A
			Raw Water	Loss of Material	Open-Cycle Cooling Water System Program			G
		Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, Moisture or Wetting, temperature <140°F	Loss of Material	Preventive Maintenance Program	VII.F4.1-a	3.3.1.B-05	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-11 Auxiliary Systems
NMP2 Domestic Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
NSR piping, fittings, and equipment	PFASRE	Any	Demineralized Untreated Water	Cracking Loss of Material	Systems Walkdown Program			J
Valves	PB	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-12 Auxiliary Systems
NMP2 Engine-Driven Fire Pump Fuel Oil System– Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
			Fuel Oil without Water Contamination	None	None			None
Tank	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil	Loss of Material	Fuel Oil Chemistry Program One-Time Inspection Program	VII.H1.4-a	3.3.1.B-07	A
Valves	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil without Water Contamination	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-13 Auxiliary Systems
NMP2 Fire Detection and Protection System– Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, Moisture or Wetting, temperature <140°F	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	C, 5
		Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	C, 5
			Air, Moisture or Wetting, temperature <140°F	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	C, 5
Fire Hydrants	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	A
Flow elements	NFS	Gray Cast Iron	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-a	3.3.1.B-21	C, 11
					Selective Leaching of Materials Program			Q

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-13 Auxiliary Systems
NMP2 Fire Detection and Protection System– Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Halon Tank Flex Hoses	NFS	Polymers	Air	Cracking	Fire Protection Program			Q
				Hardening and Shrinkage	Fire Protection Program			Q
				Loss of Strength	Fire Protection Program			Q
Heat Exchangers	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	C, 6
Hose Reels	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Fire Protection Program			Q
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-13 Auxiliary Systems
NMP2 Fire Detection and Protection System– Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Manifold	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	C, 26
Nozzles	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	C, 25
					Fire Protection Program			Q
			Dried Air or Gas	None	None			None
NSR piping, fittings, and equipment	PFASRE	Any	Raw Water, Low Flow	Cracking Loss of Material	Fire Water System Program			J
Odorizers	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Dried Air or Gas	None	None			None
			Air	Loss of Material	Fire Protection Program			Q

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-13 Auxiliary Systems
NMP2 Fire Detection and Protection System– Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Orifices	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Fire Protection Program			G
		Copper Alloys (Zinc ≤ 15%)	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	C, 7
		Wrought Austenitic Stainless Steel	Raw Water, Low Flow	Cracking	Fire Water System Program			H
				Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	C, 7
Piping and Fittings	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
					Fire Protection Program	VII.D.1-a	3.3.1.B-19	E
			Dried Air or Gas	None	None			None
			Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-a	3.3.1.B-21	A
			Soil, above the water table	Loss of Material	Buried Piping and Tanks Inspection Program	VII.C1.1-b	3.3.1.B-18	A
			Soil, below the water table	Loss of Material	Buried Piping and Tanks Inspection Program	VII.C1.1-b	3.3.1.B-18	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-13 Auxiliary Systems
NMP2 Fire Detection and Protection System– Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	NFS	Copper Alloys (Zinc > 15%) and Aluminum Bronze	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	C, 10
					Selective Leaching of Materials Program	VII.C1.1-a	3.3.1.B-29	A
		Wrought Austenitic Stainless Steel	Exhaust	Loss of Material	Fire Water System Program			F
Pumps	NFS	Gray Cast Iron	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	A
					Selective Leaching of Materials Program	VII.G.6-b	3.3.1.B-21	E
Rupture Discs	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Dried Air or Gas	None	None			None
Silencer	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Exhaust	Loss of Material	Fire Water System Program	VII.H2.4-a	3.3.1.B-05	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-13 Auxiliary Systems
NMP2 Fire Detection and Protection System– Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Strainers	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	A
		Gray Cast Iron	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	A
					Selective Leaching of Materials Program	VII.G.6-b	3.3.1.B-21	E
Tanks	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Dried Air or Gas	None	None			None
Temperature Indicators	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	C, 24

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-13 Auxiliary Systems
NMP2 Fire Detection and Protection System– Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Fire Protection Program	VII.D.2-a	3.3.1.B-19	E
					Fire Water System Program	VII.D.2-a	3.3.1.B-19	E
			Dried Air or Gas	None	None			None
			Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	A
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
			Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	A
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	A
					Selective Leaching of Materials Program	VII.C1.2-a	3.3.1.B-29	A
		Gray Cast Iron	Air	Loss of Material	Fire Water System Program			F, 27
			Raw Water, Low Flow	Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	A
					Selective Leaching of Materials Program	VII.G.6-b	3.3.1.B-21	E

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-13 Auxiliary Systems
NMP2 Fire Detection and Protection System– Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	NFS	Wrought Austenitic Stainless Steel	Raw Water, Low Flow	Cracking	Fire Water System Program			H
				Loss of Material	Fire Water System Program	VII.G.6-b	3.3.1.B-21	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-14 Auxiliary Systems
NMP2 Floor and Equipment Drains System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	NFS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	C, 5
		Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
Drain Tank	NFS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program			H
Floor Drains	NFS	Floor Drain Materials	Floor Drains	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-14 Auxiliary Systems
NMP2 Floor and Equipment Drains System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Flow Elements	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	One-Time Inspection Program			F
			Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	One-Time Inspection Program			F
		Wrought Austenitic Stainless Steel	Raw Water	Cracking	One-Time Inspection Program			H
				Loss of Material	One-Time Inspection Program	VII.C1.4-a	3.3.1.B-17	E
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program			P
NSR piping, fittings, and equipment	PFASRE	Any	Raw Water Treated Water, temperature <140°F Treated Water, temperature ≥ 140°F, but < 212°F	Cracking Loss of Material	Systems Walkdown Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-14 Auxiliary Systems
NMP2 Floor and Equipment Drains System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment (cont'd)	PFASRE	Any	Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking Loss of Material	Systems Walkdown Program			J
Piping and Fittings	DF	Floor Drain Materials	Floor Drains	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil	Loss of Material	One-Time Inspection Program			Q
			Raw Water	Loss of Material	One-Time Inspection Program	VII.C1.1-a	3.3.1.B-17	E
		Wrought Austenitic Stainless Steel	Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program			H

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-14 Auxiliary Systems
NMP2 Floor and Equipment Drains System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
			Air, Moisture or Wetting, temperature ≥ 140°F	Loss of Material	One-Time Inspection Program			Q
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program			Q
		Wrought Austenitic Stainless Steel	Air	None	None			None
			Air, Moisture or Wetting, temperature <140°F	Loss of Material	10 CFR 50 Appendix J Program			J
			Air, Moisture or Wetting, temperature ≥ 140°F	Cracking	One-Time Inspection Program			J
				Loss of Material	One-Time Inspection Program			J
			Raw Water	Cracking	10 CFR 50 Appendix J Program			H
					Preventive Maintenance Program			H

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-14 Auxiliary Systems
NMP2 Floor and Equipment Drains System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Wrought Austenitic Stainless Steel	Raw Water	Loss of Material	10 CFR 50 Appendix J Program	V.C.1-b	3.2.1.B-05 3.2.1.B-06	A
					Preventive Maintenance Program	VII.C1.1-a	3.3.1.B-17	E
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	10 CFR 50 Appendix J Program			H
					One-Time Inspection Program			H
Pumps	NFS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program			H
Orifices	FR PB	Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature ≥ 140°F	Cracking	One-Time Inspection Program			J
				Loss of Material	One-Time Inspection Program			J
Spray Nozzle	NFS	Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-14 Auxiliary Systems
NMP2 Floor and Equipment Drains System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Strainers	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	One-Time Inspection Program			Q
		Cast Austenitic Stainless Steel	Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program			J
Valves	DF	Floor Drain Materials	Floor Drains	None	None			None
	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil	Loss of Material	One-Time Inspection Program			Q
			Raw Water	Loss of Material	One-Time Inspection Program	VII.C1.2-a	3.3.1.B-17	E
		Cast Austenitic Stainless Steel	Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-14 Auxiliary Systems
NMP2 Floor and Equipment Drains System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	NFS	Wrought Austenitic Stainless Steel	Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program			H
	NFS PB[1]	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
		Wrought Austenitic Stainless Steel	Air	None	None			None

[1] This row addresses carbon and stainless steel external surfaces (other than piping and bolting).

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-14 Auxiliary Systems
NMP2 Floor and Equipment Drains System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, Moisture or Wetting, temperature ≥ 140°F	Loss of Material	One-Time Inspection Program			Q
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program			Q
		Cast Austenitic Stainless Steel	Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program			J
		Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature <140°F	Loss of Material	10 CFR 50 Appendix J Program			J
			Air, Moisture or Wetting, temperature ≥ 140°F	Cracking	One-Time Inspection Program			J
				Loss of Material	One-Time Inspection Program			J
			Raw Water	Cracking	10 CFR 50 Appendix J Program			H
				Loss of Material	10 CFR 50 Appendix J Program	V.C.1-b	3.2.1.B-05 3.2.1.B-06	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-14 Auxiliary Systems
NMP2 Floor and Equipment Drains System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	10 CFR 50 Appendix J Program			H
					One-Time Inspection Program			H

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-15 Auxiliary Systems
NMP2 Generator Standby Lube Oil System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Filters/Strainers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Lubricating Oil	None	None			None
Heat Exchangers	HT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Lubricating Oil	None	None			None
		Wrought Austenitic Stainless Steel	Lubricating Oil	None	None			None
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	Closed-Cycle Cooling Water System Program			H
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Lubricating Oil	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-15 Auxiliary Systems
NMP2 Generator Standby Lube Oil System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers (cont'd)	PB	Wrought Austenitic Stainless Steel	Lubricating Oil	None	None			None
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	Closed-Cycle Cooling Water System Program			H
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
			Lubricating Oil	None	None			None
Pumps	PB	Gray Cast Iron	Lubricating Oil	None	None			None
Orifices	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Lubricating Oil	None	None			None
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Lubricating Oil	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-16 Auxiliary Systems
NMP2 Glycol Heating System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature ≥ 140°F, but < 212°F	Cracking Loss of Material	Systems Walkdown Program			J

Table 3.3.2.B-17 Auxiliary Systems
NMP2 Hot Water Heating System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature ≥ 140°F, but < 212°F Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-18 Auxiliary Systems
NMP2 Makeup Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature <140°F	Cracking Loss of Material	Systems Walkdown Program			J

Table 3.3.2.B-19 Auxiliary Systems
NMP2 Neutron Monitoring System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bellows	PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Piping and Fittings	PB	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
Valves	PB	Wrought Austenitic Stainless Steel	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-20 Auxiliary Systems
NMP2 Primary Containment Purge System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Debris Screens	FLT	Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program	VII.F3.4-a	3.3.1.B-05	A
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, Moisture or Wetting, temperature <140°F	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
					One-Time Inspection Program	VII.F3.4-a	3.3.1.B-05	C, 10
		Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program	VII.F3.4-a	3.3.1.B-05	C, 10
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program	VII.F3.4-a	3.3.1.B-05	C, 2
		Cast Austenitic Stainless Steel	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program	VII.F3.4-a	3.3.1.B-05	C, 2

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-20 Auxiliary Systems
NMP2 Primary Containment Purge System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program	VII.F3.4-a	3.3.1.B-05	C, 2

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-21 Auxiliary Systems
NMP2 Process Sampling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature <140°F Treated Water, temperature ≥ 140°F, but < 212°F Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-22 Auxiliary Systems
NMP2 Reactor Building Closed Loop Cooling Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Demineralized Untreated Water Demineralized Untreated Water, Low Flow	Cracking Loss of Material	Closed-Cycle Cooling Water System Program Systems Walkdown Program			J
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
			Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
			Demineralized Untreated Water, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program			G
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program			G
			Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program			G
			Demineralized Untreated Water, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program			G

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-22 Auxiliary Systems
NMP2 Reactor Building Closed Loop Cooling Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Demineralized Untreated Water, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program			G

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-23 Auxiliary Systems
NMP2 Reactor Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.F2.1-a	3.3.1.B-05	A
		Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VII.F2.1-a	3.3.1.B-05	A
Ducting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F2.1-a	3.3.1.B-05	A
					Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
Filters/Strainers	PB	Wrought Austenitic Stainless Steel	Air	None	None			None
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F2.1-a	3.3.1.B-05	C, 11

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-23 Auxiliary Systems
NMP2 Reactor Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Flow Elements (cont'd)	PB	Wrought Austenitic Stainless Steel	Air	None	None			None
Piping and Fittings	PB	Polymers	Air	Cracking	Preventive Maintenance Program	VII.F2.1-b	3.3.1.B-02	A
				Hardening and Shrinkage	Preventive Maintenance Program	VII.F2.1-b	3.3.1.B-02	A
				Loss of Strength	Preventive Maintenance Program	VII.F2.1-b	3.3.1.B-02	A
		Nickel Based Alloys	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
Pumps	PB	Wrought Austenitic Stainless Steel	Air	None	None			None
Radiation Sample Points	PB	Wrought Austenitic Stainless Steel	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-23 Auxiliary Systems
NMP2 Reactor Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Unit Coolers	HT PB	Copper Alloys (Zinc ≤ 15%)	Air	Loss of Heat Transfer	Open-Cycle Cooling Water System Program			H, 9
			Raw Water	Loss of Heat Transfer	Open-Cycle Cooling Water System Program			H
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.3-a	3.3.1.B-17	A
			Raw Water, Low Flow	Loss of Heat Transfer	Open-Cycle Cooling Water System Program			H
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.3-a	3.3.1.B-17	A
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F2.1-a	3.3.1.B-05	A
					Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
			Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.3-a	3.3.1.B-17	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-23 Auxiliary Systems
NMP2 Reactor Building HVAC System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Unit Coolers (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water, Low Flow	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.3-a	3.3.1.B-17	A
		Copper Alloys (Zinc ≤ 15%)	Air	None	None			None
			Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.3-a	3.3.1.B-17	A
			Raw Water, Low Flow	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.3-a	3.3.1.B-17	A
Valves and Dampers (includes fire dampers)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Fire Protection Program	VII.F2.1-a	3.3.1.B-05	A, 30
					One-Time Inspection Program	VII.F2.1-a	3.3.1.B-05	A, 23
		Wrought Austenitic Stainless Steel	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-24 Auxiliary Systems
NMP2 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	C, 5
		Wrought Austenitic Stainless Steel	Air	None	None			None
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			Q, 1

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-24 Auxiliary Systems
NMP2 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Flow Elements (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	D, 1, 11
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-c	3.1.1.B-25	C, 11
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature <140°F Treated Water, temperature ≥ 140°F, but < 212°F	Cracking Loss of Material	BWR Reactor Water Cleanup System Program Systems Walkdown Program			J, 1, 31

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-24 Auxiliary Systems
NMP2 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment (cont'd)	PFASRE	Any	Treated Water or Steam, temperature ≥ 212°F, but < 482°F Treated Water or Steam, temperature ≥ 482°F Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking Loss of Material	BWR Reactor Water Cleanup System Program Flow-Accelerated Corrosion Program Systems Walkdown Program			J, 31
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-24 Auxiliary Systems
NMP2 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.C1.1-h	3.1.1.B-01	A
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	B, 1
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-c	3.1.1.B-25	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-24 Auxiliary Systems
NMP2 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	IV.C1.1-h	3.1.1.B-01	A
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	B, 1
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			H, 1

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-24 Auxiliary Systems
NMP2 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Loss of Material	BWR Reactor Water Cleanup System Program			H
		Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	B, 1

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-24 Auxiliary Systems
NMP2 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	B, 1
Orifices	FR PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	D, 1, 7

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-24 Auxiliary Systems
NMP2 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			H, 1
			Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	D, 1, 2

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-24 Auxiliary Systems
NMP2 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.B-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.3-a	3.1.1.B-25	A
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	D, 1, 2
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.B-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-24 Auxiliary Systems
NMP2 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program			H, 1
					BWR Reactor Water Cleanup System Program			H

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-24 Auxiliary Systems
NMP2 Reactor Water Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	D, 1, 2
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	D, 1, 2

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-25 Auxiliary Systems
NMP2 Seal Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature <140°F	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-26 Auxiliary Systems
NMP2 Service Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	C, 5
Filters/Strainers	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.6-a	3.3.1.B-17	A
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.1-a	3.3.1.B-17	C, 11
		Wrought Austenitic Stainless Steel	Raw Water	Cracking	One-Time Inspection Program			H
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.4-a	3.3.1.B-17	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-26 Auxiliary Systems
NMP2 Service Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Raw Water Raw Water, Low Flow	Cracking Loss of Material	Open-Cycle Cooling Water System Program Systems Walkdown Program			J
Orifices	FR PB	Wrought Austenitic Stainless Steel	Raw Water	Cracking	One-Time Inspection Program			H
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.4-a	3.3.1.B-17	A
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
			Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.1-a	3.3.1.B-17	A
			Raw Water, Low Flow	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.1-a	3.3.1.B-17	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-26 Auxiliary Systems
NMP2 Service Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Wrought Austenitic Stainless Steel	Raw Water	Cracking	One-Time Inspection Program			H
					Open-Cycle Cooling Water System Program			H, 18
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.1-a	3.3.1.B-17	A
			Raw Water, Low Flow	Cracking	One-Time Inspection Program			H
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.1-a	3.3.1.B-17	A
Pumps	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.5-a	3.3.1.B-17	A
		Cast Austenitic Stainless Steel	Raw Water	Cracking	One-Time Inspection Program			H
			Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.4-a	3.3.1.B-17	C, 16

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-26 Auxiliary Systems
NMP2 Service Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Temperature Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.1-a	3.3.1.B-17	C, 17
		Wrought Austenitic Stainless Steel	Raw Water	Cracking	One-Time Inspection Program			H
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.1-a	3.3.1.B-17	C, 17
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.B-17	A
			Raw Water, Low Flow	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.B-17	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-26 Auxiliary Systems
NMP2 Service Water System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Raw Water	Cracking	One-Time Inspection Program			H
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.B-17	A
			Raw Water, Low Flow	Cracking	One-Time Inspection Program			H
				Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.2-a	3.3.1.B-17	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-27 Auxiliary Systems
NMP2 Spent Fuel Pool Cooling and Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Filters/Strainers	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
Flow Elements	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
Heat Exchangers	HT PB	Wrought Austenitic Stainless Steel	Demineralized Untreated Water	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program			H, 9
			Treated Water, temperature <140°F	None	None			None
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Demineralized Untreated Water	Loss of Material	Closed-Cycle Cooling Water System Program	VII.A4.4-a	3.3.1.B-15	B
		Wrought Austenitic Stainless Steel	Demineralized Untreated Water	None	None			None
			Treated Water, temperature <140°F	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-27 Auxiliary Systems
NMP2 Spent Fuel Pool Cooling and Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Demineralized Untreated Water Treated Water, temperature <140°F	Cracking Loss of Material	Closed-Cycle Cooling Water System Program Systems Walkdown Program Water Chemistry Control Program			J
Orifices	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
					One-Time Inspection Program	V.D2.1-e	3.2.1.B-03	A
			Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.1-a	3.2.1.B-02	B
		Wrought Austenitic Stainless Steel	Air	None	None			None
			Treated Water, temperature <140°F	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-27 Auxiliary Systems
NMP2 Spent Fuel Pool Cooling and Cleanup System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Pumps	PB	Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
Tanks	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	V.D2.1-e	3.2.1.B-03	C, 2
			Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	V.D2.3-b	3.2.1.B-02	B
		Cast Austenitic Stainless Steel	Air	None	None			None
			Treated Water, temperature <140°F	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
			Treated Water, temperature <140°F	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-28 Auxiliary Systems
NMP2 Standby Diesel Generator Fuel Oil System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	C, 5
Filters/Strainers	FLT PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil without Water Contamination	None	None			None
Flow Elements	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil without Water Contamination	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-28 Auxiliary Systems
NMP2 Standby Diesel Generator Fuel Oil System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers	HT PB	Wrought Austenitic Stainless Steel	Fuel Oil without Water Contamination	None	None			None
			Treated Water, temperature <140°F	None	None			None
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil without Water Contamination	None	None			None
		Wrought Austenitic Stainless Steel	Fuel Oil without Water Contamination	None	None			None
			Treated Water, temperature <140°F	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-28 Auxiliary Systems
NMP2 Standby Diesel Generator Fuel Oil System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
					One-Time Inspection Program			G
			Fuel Oil without Water Contamination	None	None			None
		Wrought Austenitic Stainless Steel	Fuel Oil without Water Contamination	None	None			None
Pumps	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil without Water Contamination	None	None			None
Tanks	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.H1.4-b	3.3.1.B-23	E
			Fuel Oil	Loss of Material	Fuel Oil Chemistry Program One-Time Inspection Program	VII.H1.4-a	3.3.1.B-07	A
						VII.H2.5-a	3.3.1.B-07	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-28 Auxiliary Systems
NMP2 Standby Diesel Generator Fuel Oil System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil without Water Contamination	None	None			None
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Fuel Oil without Water Contamination	None	None			None
		Wrought Austenitic Stainless Steel	Fuel Oil without Water Contamination	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-29 Auxiliary Systems
NMP2 Standby Diesel Generator Protection (Generator) System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	C, 5
Heat Exchangers	HT PB	Copper Alloys (Zinc ≤ 15%)	Raw Water	Loss of Heat Transfer	Open-Cycle Cooling Water System Program			F
				Loss of Material	Open-Cycle Cooling Water System Program			F
			Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Heat Transfer	Closed-Cycle Cooling Water System Program			H
		Wrought Austenitic Stainless Steel	Fuel Oil without Water Contamination	None	None			None
			Lubricating Oil	None	None			None
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	Closed-Cycle Cooling Water System Program			M

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-29 Auxiliary Systems
NMP2 Standby Diesel Generator Protection (Generator) System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Heat Exchangers (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Fuel Oil without Water Contamination	None	None			None
			Lubricating Oil	None	None			None
			Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.C1.3-a	3.3.1.B-17	A
			Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.H2.1-a	3.3.1.B-15	D, 6
		Wrought Austenitic Stainless Steel	Fuel Oil without Water Contamination	None	None			None
			Lubricating Oil	None	None			None
			Raw Water	Cracking	Open-Cycle Cooling Water System Program			M
				Loss of Material	Open-Cycle Cooling Water System Program			F
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	Closed-Cycle Cooling Water System Program			M

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-29 Auxiliary Systems
NMP2 Standby Diesel Generator Protection (Generator) System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3
					One-Time Inspection Program	VII.H2.2-a	3.3.1.B-05	A
			Exhaust	Loss of Material	One-Time Inspection Program	VII.H2.4-a	3.3.1.B-05	A
			Fuel Oil without Water Contamination	None	None			None
			Lubricating Oil	None	None			None
			Raw Water	Loss of Material	Open-Cycle Cooling Water System Program	VII.H2.1-b	3.3.1.B-17	A
			Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	Closed-Cycle Cooling Water System Program	VII.C2.1-a	3.3.1.B-15	B
Pumps	PB	Gray Cast Iron	Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	Closed-Cycle Cooling Water System Program			G
					Selective Leaching of Materials Program			G

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-29 Auxiliary Systems
NMP2 Standby Diesel Generator Protection (Generator) System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.H2.2-a	3.3.1.B-05	A
			Treated Water, temperature ≥ 140°F, but < 212°F	Loss of Material	Closed-Cycle Cooling Water System Program			G
		Copper Alloys (Zinc > 15%) and Aluminum Bronze	Lubricating Oil	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None
			Fuel Oil without Water Contamination	None	None			None
			Lubricating Oil	None	None			None
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	Closed-Cycle Cooling Water System Program			L

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-30 Auxiliary Systems
NMP2 Standby Liquid Control System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Filters/Strainers	PB	Cast Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
Flow Elements	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
Piping and Fittings	NFS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
	PB	Wrought Austenitic Stainless Steel	Sodium Pentaborate Solution	None	None			None
			Treated Water, temperature <140°F	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-30 Auxiliary Systems
NMP2 Standby Liquid Control System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	B, 1
Pumps	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
Orifices	FR PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
Tanks	PB	Wrought Austenitic Stainless Steel	Sodium Pentaborate Solution	None	None			None
Temperature Elements	PB	Wrought Austenitic Stainless Steel	Sodium Pentaborate Solution	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-30 Auxiliary Systems
NMP2 Standby Liquid Control System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	NFS	Wrought Austenitic Stainless Steel	Dried Air or Gas	None	None			None
			Treated Water, temperature <140°F	None	None			None
	PB	Cast Austenitic Stainless Steel	Sodium Pentaborate Solution	None	None			None
			Treated Water, temperature <140°F	None	None			None
		Wrought Austenitic Stainless Steel	Air, Moisture or Wetting, temperature <140°F	Loss of Material	One-Time Inspection Program			L
			Sodium Pentaborate Solution	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-30 Auxiliary Systems
NMP2 Standby Liquid Control System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-i	3.1.1.B-07	D, 1, 2

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-31 Auxiliary Systems
NMP2 Yard Structures Ventilation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Blowers	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Preventive Maintenance Program	VII.F2.1-a	3.3.1.B-05	A
Dampers (includes fire dampers)	NFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Fire Protection Program	VII.F2.1-a	3.3.1.B-05	A, 30
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F2.1-a	3.3.1.B-05	A, 23
Ducting	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	VII.F2.1-a	3.3.1.B-05	A
					Systems Walkdown Program	VII.I.1-b	3.3.1.B-05	A, 3

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.3.2.B-31 Auxiliary Systems
NMP2 Yard Structures Ventilation System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Unit Coolers	HT PB	Copper Alloys (Zinc ≤ 15%)	Air, Moisture or Wetting, temperature <140°F	Loss of Heat Transfer	Preventive Maintenance Program			H
				Loss of Material	Preventive Maintenance Program	VII.F2.2-a	3.3.1.B-05	A
			Raw Water	Loss of Heat Transfer	Open-Cycle Cooling Water System Program			F
				Loss of Material	Open-Cycle Cooling Water System Program			F
	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, Moisture or Wetting, temperature <140°F	Loss of Material	Preventive Maintenance Program	VII.F2.1-a	3.3.1.B-05	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Notes for Tables 3.3.2.A-1 through 3.3.2.B-31:

A. Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

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

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

D. Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.

E. Consistent with NUREG-1801 for material, environment, and aging effect, but a different aging management program is credited.

F. Material not in NUREG-1801 for this component.

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

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

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

J. Neither the component nor the material and environment combination is evaluated in NUREG-1801.

K. Material and environment not in NUREG-1801 for this component and aging effect.

L. Aging effect and environment not in NUREG-1801 for this component and material.

M. Aging effect and material not in NUREG-1801 for this component and environment.

N. Aging effect, material, and environment not in NUREG-1801 for this component.

P. Component and aging effect not in NUREG-1801 for this material and environment.

Q. Component not in NUREG-1801 for this material, environment, and aging effect.

(Note “O” was not used to avoid confusion with the number zero)

Plant Specific Notes:

1. This row applies to small bore valves, piping, and flow elements that are included in the Inservice Inspection Testing program.

2. Valves are not identified in NUREG-1801 for this GALL row number.

3. This row applies to the external surfaces of carbon steel components.

4. This row applies to fire damper sleeves.

5. Bolting is not identified in NUREG-1801 for this GALL row number.

6. Heat Exchangers are not identified in NUREG-1801 for this GALL row number.

7. Orifices are not identified in NUREG-1801 for this GALL row number.

8. Circulating water gates, traveling screens, and rakes are not identified in NUREG-1801 for this GALL row number.

9. While this component has two intended functions (i.e., pressure boundary and heat transfer), the aging effect of loss of heat transfer only applies to the heat transfer intended function. There are no aging effects associated with the pressure boundary intended function.

10. Piping and fittings are not identified in NUREG-1801 for this GALL row number.

11. Flow elements are not identified in NUREG-1801 for this GALL row number.

12. This row applies to the external surfaces of sheet metal ductwork.

13. This row applies to the external surfaces of stainless steel components.

14. Heat exchanger closure bolting is not identified in NUREG-1801 for this GALL row number.

15. Tanks are not identified in NUREG-1801 for this GALL row number.

16. Pumps are not identified in NUREG-1801 for this GALL row number.

17. Temperature elements are not identified in NUREG-1801 for this GALL row number.

18. This row applies to the Service Water chemical treatment sodium bisulfate injection line.

19. Diesel engine air start motors and starting air lubricators are not identified in NUREG-1801 for this GALL row number.

20. Air separators are not identified in NUREG-1801 for this GALL row number.

21. Spray Nozzles are not identified in NUREG-1801 for this GALL row number.

22. Sluice Gate for Motor Driven Fire Pump is not identified in NUREG-1801 for this GALL row number.

23. This row applies to dampers.
24. Temperature indicators are not identified in NUREG-1801 for this GALL row number.
25. Hose reel nozzles are not identified in NUREG-1801 for this GALL row number.
26. Manifolds are not identified in NUREG-1801 for this GALL row number.
27. This row applies to the external surfaces of gray cast iron components.
28. Rupture Discs are not identified in NUREG-1801 for this GALL row number.
29. This row applies to small bore valves and piping that are not included in the Inservice Inspection Testing program.
30. This row applies to fire dampers.
31. The Flow Accelerated Corrosion program only applies to the aging effect of loss of material.

3.4 AGING MANAGEMENT OF STEAM AND POWER CONVERSION SYSTEMS

3.4.1 INTRODUCTION

This section provides the results of the aging management review for those components identified in Section 2.3.4, Steam and Power Conversion Systems, as being subject to aging management review. The systems, or portions of systems, which are addressed in this section, are described in the indicated sections.

NMP1

- NMP1 Condensate and Condensate Transfer System (Section 2.3.4.A.1)
- NMP1 Feedwater/High Pressure Coolant Injection System (Section 2.3.4.A.3)
- NMP1 Main Generator and Auxiliary System (Section 2.3.4.A.4)
- NMP1 Main Steam System (Section 2.3.4.A.5)

NMP2

- NMP2 Main Condenser Air Removal System (Section 2.3.4.B.1)
- NMP2 Condensate System (Section 2.3.4.B.2)
- NMP2 Feedwater System (Section 2.3.4.B.3)
- NMP2 Main Steam System (Section 2.3.4.B.4)
- NMP2 Moisture Separator and Reheater System (Section 2.3.4.B.5)

Tables 3.4.1.A, NMP1 Summary of Aging Management Programs for the Steam and Power Conversion Systems Evaluated in Chapter VIII of NUREG-1801, and 3.4.1.B, NMP2 Summary of Aging Management Programs for the Steam and Power Conversion Systems Evaluated in Chapter VIII of NUREG-1801, provide the summary of the programs evaluated in NUREG-1801 for the Steam and Power Conversion component groups that are relied on for license renewal.

These tables use the format described in Section 3.0. Note that these tables only include results for those component groups that are applicable to a BWR.

3.4.2 RESULTS

The following tables summarize the results of the aging management review for systems in the Steam and Power Conversion group.

NMP1

- Table 3.4.2.A-1 Steam and Power Conversion System - NMP1 Condensate and Condensate Transfer System – Summary of Aging Management Evaluation
- Table 3.4.2.A-2 Steam and Power Conversion System - Feedwater/High Pressure Coolant Injection System – Summary of Aging Management Evaluation
- Table 3.4.2.A-3 Steam and Power Conversion System - NMP1 Main Generator and Auxiliary System – Summary of Aging Management Evaluation
- Table 3.4.2.A-4 Steam and Power Conversion System - NMP1 Main Steam System – Summary of Aging Management Evaluation

NMP2

- Table 3.4.2.B-1 Steam and Power Conversion System - NMP2 Main Condenser Air Removal System – Summary of Aging Management Evaluation
- Table 3.4.2.B-2 Steam and Power Conversion System - NMP2 Condensate System – Summary of Aging Management Evaluation
- Table 3.4.2.B-3 Steam and Power Conversion System - NMP2 Feedwater System – Summary of Aging Management Evaluation
- Table 3.4.2.B-4 Steam and Power Conversion System - NMP2 Main Steam System – Summary of Aging Management Evaluation
- Table 3.4.2.B-5 Steam and Power Conversion System - NMP2 Moisture Separator and Reheater System – Summary of Aging Management Evaluation

The materials from which specific components are fabricated, the environments to which components are exposed, the 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 3.4.2.A, NMP1 Materials, Environments, Aging Effects Requiring Management and Aging Management Programs, and Section 3.4.2.B, NMP2 Materials, Environments, Aging Effects Requiring Management and Aging Management Programs:

NMP1

- Section 3.4.2.A.1, NMP1 Condensate System
- Section 3.4.2.A.2, NMP1 Feedwater/High Pressure Coolant Injection System
- Section 3.4.2.A.3, NMP1 Main Generator and Auxiliary System
- Section 3.4.2.A.4, NMP1 Main Steam System

NMP2

- Section 3.4.2.B.1, NMP2 Main Condenser Air Removal System
- Section 3.4.2.B.2, NMP2 Condensate System
- Section 3.4.2.B.3, NMP2 Feedwater System
- Section 3.4.2.B.4, NMP2 Main Steam System
- Section 3.4.2.B.5, NMP2 Moisture Separator and Reheater System

3.4.2.A NMP1 MATERIALS, ENVIRONMENTS, AGING EFFECTS REQUIRING MANAGEMENT AND AGING MANAGEMENT PROGRAMS

3.4.2.A.1 NMP1 CONDENSATE SYSTEM

Materials

The materials of construction for the NMP1 Condensate and Condensate Transfer System components are:

- Aluminum alloys containing copper or zinc as the primary alloying elements
- Any (this applies to NSR piping, fittings, and equipment)
- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Cast Austenitic Stainless Steel
- Copper Alloys (Zinc ≤ 15%)
- Glass
- Gray Cast Iron
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Condensate and Condensate Transfer System components are exposed to the following environments:

- Air
- Dried Air or Gas
- Lubricating Oil
- Treated Water, temperature < 140°F
- Treated Water, temperature < 140°F, Low Flow

- Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Condensate System, require management:

- Cracking
- Loss of Material
- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effect for the NMP1 Condensate and Condensate Transfer System components:

- One-Time Inspection Program
- Preventive Maintenance Program
- Selective Leaching of Materials Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.4.2.A.2 NMP1 FEEDWATER/HIGH PRESSURE COOLANT INJECTION SYSTEM

Materials

The materials of construction for the NMP1 Feedwater/High Pressure Coolant Injection System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Copper Alloys (Zinc ≤ 15%)
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Feedwater/High Pressure Coolant Injection System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F
- Demineralized Untreated Water, Low Flow
- Lubricating Oil
- Treated Water, temperature < 140°F
- Treated Water, temperature < 140°F, Low Flow
- Treated Water, temperature ≥ 140°F, but < 212°F
- Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Feedwater/High Pressure Coolant Injection System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Feedwater/High Pressure Coolant Injection System components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- Closed-Cycle Cooling Water System Program
- Fatigue Monitoring Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.4.2.A.3 NMP1 MAIN GENERATOR AND AUXILIARY SYSTEM

Material

The material of construction for the NMP1 Main Generator and Auxiliary System components is:

- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron

Environments

The NMP1 Main Generator and Auxiliary System components are exposed to the following environments:

- Air
- Dried Air or Gas

Aging Effect Requiring Management

The following aging effect, associated with the NMP1 Main Generator and Auxiliary System, requires management:

- Loss of Material

Aging Management Program

The following aging management program manages the aging effect for the NMP1 Main Generator and Auxiliary System components:

- Systems Walkdown Program

3.4.2.A.4 NMP1 MAIN STEAM SYSTEM

Materials

The materials of construction for the NMP1 Main Steam System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon Steel, Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Nickel Based Alloys
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Main Steam System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F
- Demineralized Untreated Water, Low Flow
- Treated Water or Steam, temperature ≥ 482°F
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the Main Steam System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for Main Steam System components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- Fatigue Monitoring Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.4.2.B NMP2 MATERIALS, ENVIRONMENTS, AGING EFFECTS REQUIRING MANAGEMENT AND AGING MANAGEMENT PROGRAMS

3.4.2.B.1 NMP2 MAIN CONDENSER AIR REMOVAL SYSTEM

Material

The material of construction for the NMP2 Main Condenser Air Removal System components is:

- Any (this applies to NSR piping, fittings, and equipment)

Environments

The NMP2 Main Condenser Air Removal System components are exposed to the following environments:

- Treated Water, temperature < 140°F, Low Flow
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Main Condenser Air Removal System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Main Condenser Air Removal System components:

- Systems Walkdown Program
- Water Chemistry Control Program

3.4.2.B.2 NMP2 CONDENSATE SYSTEM

Materials

The materials of construction for the NMP2 Condensate System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Condensate System components are exposed to the following environments:

- Air
- Treated Water, temperature < 140°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Condensate System, require management:

- Cracking
- Hardening and Shrinkage
- Loss of Material
- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Condensate System components:

- One-Time Inspection Program
- Preventive Maintenance Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.4.2.B.3 NMP2 FEEDWATER SYSTEM

Materials

The materials of construction for the NMP2 Feedwater System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron

Environments

The NMP2 Feedwater System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow
- Treated Water or Steam, temperature ≥ 482°F
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the Feedwater System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Feedwater System components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- Fatigue Monitoring Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.4.2.B.4 NMP2 MAIN STEAM SYSTEM

Materials

The materials of construction for the NMP2 Main Steam System components are:

- Any (this applies to NSR piping, fittings, and equipment)
- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Main Steam System components are exposed to the following environments:

- Air
- Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F
- Demineralized Untreated Water, Low Flow
- Treated Water, temperature < 140°F, Low Flow
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F
- Treated Water or Steam, temperature ≥ 482°F
- Treated Water or Steam, temperature ≥ 482°F, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Main Steam System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Main Steam System components:

- ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program
- BWR Stress Corrosion Cracking Program
- Fatigue Monitoring Program
- Flow-Accelerated Corrosion Program
- One-Time Inspection Program

- Systems Walkdown Program
- Water Chemistry Control Program

3.4.2.B.5 NMP2 MOISTURE SEPARATOR AND REHEATER SYSTEM

Material

The material of construction for the NMP2 Moisture Separator and Reheater System components is:

- Any (this applies to NSR piping, fittings, and equipment)

Environments

The NMP2 Moisture Separator and Reheater System components are exposed to the following environments:

- Treated Water, temperature <140°F
- Treated Water or Steam, temperature ≥ 212°F, but < 482°F
- Treated Water or Steam, temperature ≥ 482°F

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Moisture Separator and Reheater System, require management:

- Cracking
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Moisture Separator and Reheater components:

- Flow-Accelerated Corrosion Program
- Systems Walkdown Program
- Water Chemistry Control Program

3.4.3 TIME-LIMITED AGING ANALYSES

The Time-Limited Aging Analyses (TLAAs) identified below are associated with the Steam and Power Conversion components. The section of the LRA that contains the TLAA review results is indicated in parenthesis.

- Metal Fatigue Analysis (Section 4.3)
- NMP2 Main Steam Isolation Valve Corrosion Allowance (Section 4.7.2)

3.4.4 CONCLUSIONS

The Steam and Power Conversion components that are subject to aging management review have been identified in accordance with the requirements of 10 CFR 54.4. The aging management programs selected to manage aging effects for the Steam and Power Conversion components are identified in the summary tables and Section 3.4.2. A description of these aging management programs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation. Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the Steam and Power Conversion 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.A NMP1 Summary of Aging Management Programs for the Steam and Power Conversion Systems Evaluated in Chapter VIII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1.A-01	Piping and fittings in main feedwater line, steam line and auxiliary feedwater (AFW) piping (PWR only)	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	The NMP1 Main Steam and Feedwater/High Pressure Coolant Injection piping and fittings with this aging effect/mechanism are evaluated in row 3.1.1.A-01 since they are part of the reactor coolant pressure boundary. Piping and fittings for the NMP1 Automatic Depressurization System are evaluated as part of the Main Steam System. Additionally, the following components are consistent with, but not addressed, in NUREG-1801: • Flow elements • Flow orifices • Pumps • Valves The TLAA is further evaluated in Section 4.3.

Table 3.4.1.A NMP1 Summary of Aging Management Programs for the Steam and Power Conversion Systems Evaluated in Chapter VIII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1.A-02	Piping and fittings, valve bodies and bonnets, pump casings, tanks, tubes, tubesheets, channel head, and shell (except main steam system)	Loss of material due to general (carbon steel only), pitting, and crevice corrosion	Water chemistry and one-time inspection	Yes, detection of aging effects should be further evaluated	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2) (Water Chemistry Control Program). Additionally, the following components are consistent with, but not addressed, in NUREG-1801: • Filters/strainers • Flow Gauges • Flow Elements • Flow Indicators • Flow Orifices Further evaluation is documented in Appendix B2.1.2 (Water Chemistry Control Program) and Appendix B2.1.20 (One-Time Inspection Program).
3.4.1.A-03	PWR only				
3.4.1.A-04	PWR only				
3.4.1.A-05	External surface of carbon steel components	Loss of material due to general corrosion	Plant Specific	Yes, plant specific	Consistent with NUREG-1801. Further evaluation is documented in Appendix B2.1.33 (Systems Walkdown Program).
3.4.1.A-06	Carbon steel piping and valve bodies	Wall thinning due to flow-accelerated corrosion	Flow-Accelerated Corrosion	No	Consistent with NUREG-1801. Valves that are part of the reactor coolant pressure boundary are evaluated in Chapter IV of NUREG-1801. Additionally, the following components are consistent with, but not addressed, in NUREG-1801: • Flow elements • Flow orifices

Table 3.4.1.A NMP1 Summary of Aging Management Programs for the Steam and Power Conversion Systems Evaluated in Chapter VIII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1.A-07	Carbon steel piping and valve bodies in main steam system	Loss of material due to pitting and crevice corrosion	Water Chemistry	No	Not applicable because the NMP1 Main Steam carbon steel piping in a treated water environment does not have this aging effect/mechanism. Note: the applicable NUREG-1801, Volume 2 items (VIII.B2.1-a and VIII.B2.1-b) only address piping and fittings. Main Steam valves are evaluated in 3.4.1.A-02. Valves that are part of the Engineered Safety Features System boundary are evaluated in 3.2.1.A-03 and 3.2.1.A-05.
3.4.1.A-08	Closure bolting in high-pressure or high-temperature systems	Loss of material due to general corrosion; crack initiation and growth due to cyclic loading and/or SCC.	Bolting integrity	No	Not applicable because the environment causing the AERM in the NUREG-1801 Volume 2 item for bolting includes leaking fluid, whereas, the NMP1 environment for bolting does not assume leakage.
3.4.1.A-09	Heat exchangers and coolers/ condensers serviced by open-cycle cooling water	Loss of material due to general (carbon steel only), pitting, and crevice corrosion, MIC, and biofouling; buildup of deposit due to biofouling	Open-cycle cooling water system	No	Not applicable for the following reasons: • The NMP1 condenser hotwell is evaluated in row 3.4.1.A-02. • All other heat exchangers are of a different material (copper alloys or stainless steel) and do not have this aging effect/mechanism.
3.4.1.A-10	Heat exchangers and coolers/ condensers serviced by closed-cycle cooling water	Loss of material due to general (carbon steel only), pitting, and crevice corrosion	Closed-cycle cooling water system	No	Not applicable for the following reasons: • The NMP1 condenser hotwell is evaluated in row 3.4.1.A-02. • All other heat exchangers are of a different material (copper alloys or stainless steel) and do not have this aging effect/mechanism.

Table 3.4.1.A NMP1 Summary of Aging Management Programs for the Steam and Power Conversion Systems Evaluated in Chapter VIII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1.A-11	External surface of aboveground condensate storage tank	Loss of material due to general (carbon steel only), pitting, and crevice corrosion	Aboveground carbon steel tanks	No	Not applicable because the NMP1 condensate storage tanks are inside and are not exposed to the external environments in NUREG-1801 Volume II Item VIII.E.5-c. External surfaces of carbon steel components are evaluated in row 3.4.1.A-05
3.4.1.A-12	External surface of buried condensate storage tank and AFW piping	Loss of material due to general, pitting, and crevice corrosion, and MIC	Buried piping and tanks surveillance or Buried piping and tanks inspection	No Yes, detection of aging effects and operating experience are to be further evaluated	Not applicable because the NMP1 condensate storage tanks are not exposed to a buried environment. Not applicable for AFW piping because this piping only applies to a PWR.
3.4.1.A-13	PWR only				

Table 3.4.1.B NMP2 Summary of Aging Management Programs for the Steam and Power Conversion Systems Evaluated in Chapter VIII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1.B-01	Piping and fittings in main feedwater line, steam line and auxiliary feedwater (AFW) piping (PWR only)	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	The NMP2 Main Steam and Feedwater piping and fittings with this aging effect/mechanism are evaluated in row 3.1.1.B-01 since they are part of the reactor coolant pressure boundary. Piping and fittings for the NMP2 Automatic Depressurization System are evaluated as part of the Main Steam System. The TLAA is further evaluated in Section 4.3.
3.4.1.B-02	Piping and fittings, valve bodies and bonnets, pump casings, tanks, tubes, tubesheets, channel head, and shell (except main steam system)	Loss of material due to general (carbon steel only), pitting, and crevice corrosion	Water chemistry and one-time inspection	Yes, detection of aging effects should be further evaluated	Consistent with NUREG-1801 for piping and fittings, valve bodies, and bonnets with this aging effect (exceptions to the Water Chemistry Program are documented in Appendix B2.1.2). Not applicable for pump casings, tanks, tubes, tubesheets, channel head, and shell because these components are either not in scope or do not have this aging effect. Further evaluation is documented in Appendix B2.1.2 (Water Chemistry Program) and Appendix B2.1.20 (One-Time Inspection Program).
3.4.1.B-03	PWR only				
3.4.1.B-04	PWR only				
3.4.1.B-05	External surface of carbon steel components	Loss of material due to general corrosion	Plant Specific	Yes, plant specific	Consistent with NUREG-1801. Further evaluation is documented in Appendix B2.1.33 (Systems Walkdown Program).

Table 3.4.1.B NMP2 Summary of Aging Management Programs for the Steam and Power Conversion Systems Evaluated in Chapter VIII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1.B-06	Carbon steel piping and valve bodies	Wall thinning due to flow-accelerated corrosion	Flow-Accelerated Corrosion	No	Consistent with NUREG-1801 for NMP2 Feedwater System piping with this aging effect/mechanism. The remaining carbon steel piping and valves with this aging effect/mechanism are evaluated in Chapter IV of NUREG-1801 (row 3.1.1.B-25) since they are part of the reactor coolant pressure boundary.
3.4.1.B-07	Carbon steel piping and valve bodies in main steam system	Loss of material due to pitting and crevice corrosion	Water Chemistry	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.2). NMP2 also credits the One-Time Inspection Program (Appendix B2.1.20), in addition to the Water Chemistry Program, for small bore piping and valves in a treated water environment.
3.4.1.B-08	Closure bolting in high-pressure or high-temperature systems	Loss of material due to general corrosion; crack initiation and growth due to cyclic loading and/or SCC.	Bolting integrity	No	Not applicable because the environment causing the AERM in the NUREG-1801, Volume 2 item for bolting includes leaking fluid, whereas, the NMPNS environment for bolting does not assume leakage.
3.4.1.B-09	Heat exchangers and coolers/ condensers serviced by open-cycle cooling water	Loss of material due to general (carbon steel only), pitting, and crevice corrosion, MIC, and biofouling; buildup of deposit due to biofouling	Open-cycle cooling water system	No	Not applicable because these components are not subject to an AMR in the NMP2 Steam and Power Conversion Systems.
3.4.1.B-10	Heat exchangers and coolers/ condensers serviced by closed-cycle cooling water	Loss of material due to general (carbon steel only), pitting, and crevice corrosion	Closed-cycle cooling water system	No	Not applicable because these components are not subject to an AMR in the NMP2 Steam and Power Conversion Systems.

Table 3.4.1.B NMP2 Summary of Aging Management Programs for the Steam and Power Conversion Systems Evaluated in Chapter VIII of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1.B-11	External surface of aboveground condensate storage tank	Loss of material due to general (carbon steel only), pitting, and crevice corrosion	Aboveground carbon steel tanks	No	Not applicable because the NMP2 condensate storage tanks are inside and are not exposed to the external environments in NUREG-1801, Volume II, Item VIII.E.5-c. External surfaces of carbon steel components are evaluated in row 3.4.1.B-05
3.4.1.B-12	External surface of buried condensate storage tank and AFW piping	Loss of material due to general, pitting, and crevice corrosion, and MIC	Buried piping and tanks surveillance or Buried piping and tanks inspection	No Yes, detection of aging effects and operating experience are to be further evaluated	Not applicable because the NMP2 condensate storage tanks are not exposed to a buried environment. Not applicable for AFW piping because this piping only applies to a PWR.
3.4.1.B-13	PWR only				

Table 3.4.2.A-1 Steam and Power Conversion System
NMP1 Condensate and Condensate Transfer System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Condensate Demineralizers	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, Temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.6-a	3.4.1.A-02	B
Filters/Strainers	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, Temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.6-a	3.4.1.A-02	B
		Wrought Austenitic Stainless Steel	Treated Water, Temperature < 140°F	None	None			None
Flow Elements	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, Temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.1-b	3.4.1.A-02	D, 3

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-1 Steam and Power Conversion System
NMP1 Condensate and Condensate Transfer System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Flow Gauges	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.1-b	3.4.1.A-02	D, 2
Flow Indicators	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
Flow Orifices	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
Level Observation Glasses	NFS	Glass	Treated Water, temperature < 140°F, Low Flow	None	None			None
Main Condenser	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.4-a	3.4.1.A-02	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-1 Steam and Power Conversion System
NMP1 Condensate and Condensate Transfer System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature < 140°F Treated Water, temperature < 140°F, Low Flow Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J
Piping and Fittings	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Lubricating Oil	None	None			None
			Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.1-b	3.4.1.A-02	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-1 Steam and Power Conversion System
NMP1 Condensate and Condensate Transfer System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings (cont'd)	NFS	Polymers	Treated Water, temperature < 140°F	Cracking	Preventive Maintenance Program			J
				Loss of Strength	Preventive Maintenance Program			J
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.A-05	A, 1
			Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.1-b	3.4.1.A-02	B
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.1-b	3.4.1.A-02	B
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-1 Steam and Power Conversion System
NMP1 Condensate and Condensate Transfer System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Pumps	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.3-a	3.4.1.A-02	B
	PB	Gray Cast Iron	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Selective Leaching of Materials Program Water Chemistry Control Program			F
Tanks	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-1 Steam and Power Conversion System
NMP1 Condensate and Condensate Transfer System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	NFS	Aluminum alloys containing copper or zinc as the primary alloying elements	Treated Water, temperature < 140°F	Cracking	One-Time Inspection Program Water Chemistry Control Program			M
		Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Dried Air or Gas	None	None			None
			Lubricating Oil	None	None			None
			Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.2-b	3.4.1.A-02	B
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.2-b	3.4.1.A-02	B
		Copper Alloys (Zinc ≤ 15%)	Treated Water, temperature < 140°F	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-1 Steam and Power Conversion System
NMP1 Condensate and Condensate Transfer System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	NFS	Gray Cast Iron	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Selective Leaching of Materials Program Water Chemistry Control Program			F
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
			Treated Water, temperature < 140°F, Low Flow	None	None			None
	PB	Aluminum alloys containing copper or zinc as the primary alloying elements	Treated Water, temperature < 140°F	Cracking	One-Time Inspection Program Water Chemistry Control Program			M
			Treated Water, temperature < 140°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program			M

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-1 Steam and Power Conversion System
NMP1 Condensate and Condensate Transfer System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.2-b	3.4.1.A-02	B
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.2-b	3.4.1.A-02	B
		Cast Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
		Copper Alloys (Zinc ≤ 15%)	Treated Water, temperature < 140°F	None	None			None
			Treated Water, temperature < 140°F, Low Flow	None	None			None
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F	None	None			None
			Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-2 Steam and Power Conversion System
NMP1 Feedwater/High Pressure Coolant Injection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program			G
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			G
	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program			G
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			G
Feedwater Heaters	NFS	Wrought Austenitic Stainless Steel	Treated Water, temperature <140°F	None	None			None
			Treated Water, temperature ≥ 140°F, but < 212°F	Cracking	One-Time Inspection Program Water Chemistry Control Program			Q

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-2 Steam and Power Conversion System
NMP1 Feedwater/High Pressure Coolant Injection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Feedwater Heaters (cont'd)	NFS	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program One-Time Inspection Program Water Chemistry Control Program			Q
Filters/Strainers	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Lubricating Oil	None	None			None
			Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.1-b	3.4.1.A-02	D, 4
Flow Elements	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.1-b	3.4.1.A-02	D, 3
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	VIII.D2.1-c	3.4.1.A-01	C, 3
				Loss of Material	Flow-Accelerated Corrosion Program	VIII.D2.1-a	3.4.1.A-06	C, 3

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-2 Steam and Power Conversion System
NMP1 Feedwater/High Pressure Coolant Injection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Flow Indicators	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.1-b	3.4.1.A-02	D, 12
Flow Orifices	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature <140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.1-b	3.4.1.A-02	D, 5
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	VIII.D2.1-c	3.4.1.A-01	C, 5
				Loss of Material	Flow-Accelerated Corrosion Program	VIII.D2.1-a	3.4.1.A-06	C, 5
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cracking	Fatigue Monitoring Program	VIII.D2.1-c	3.4.1.A-01	C, 5
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.1-b	3.4.1.A-02	D, 5

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-2 Steam and Power Conversion System
NMP1 Feedwater/High Pressure Coolant Injection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Demineralized Untreated Water Treated Water, temperature < 140°F Treated Water, temperature < 140°F, Low Flow Treated Water, temperature ≥ 140°F, but < 212°F Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-2 Steam and Power Conversion System
NMP1 Feedwater/High Pressure Coolant Injection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment (cont'd)	PFASRE	Any	Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking Loss of Material	Flow-Accelerated Corrosion Program Systems Walkdown Program Water Chemistry Control Program			J, 15
Oil Coolers	NFS	Copper Alloys (Zinc ≤ 15%)	Demineralized Untreated Water, Low Flow	Loss of Material	Closed-Cycle Cooling Water System Program			Q
			Lubricating Oil	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-2 Steam and Power Conversion System
NMP1 Feedwater/High Pressure Coolant Injection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Lubricating Oil	None	None			None
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	IV.C1.1-d	3.1.1.A-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-c	3.1.1.A-25	A
	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.A-05	A, 1
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	IV.C1.1-d	3.1.1.A-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-c	3.1.1.A-25	A
Pumps	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Lubricating Oil	None	None			None
			Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.3-b	3.4.1.A-02	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-2 Steam and Power Conversion System
NMP1 Feedwater/High Pressure Coolant Injection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Pumps (cont'd)	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	VIII.D2.1-c	3.4.1.A-01	C, 6
				Loss of Material	Flow-Accelerated Corrosion Program	VIII.D2.3-a	3.4.1.A-06	A
Valves	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Lubricating Oil	None	None			None
			Treated Water, temperature < 140°F	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.2-b	3.4.1.A-02	B
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.2-b	3.4.1.A-02	B
			Treated Water, temperature ≥ 140°F, but < 212°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.2-b	3.4.1.A-02	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-2 Steam and Power Conversion System
NMP1 Feedwater/High Pressure Coolant Injection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	VIII.D2.1-c	3.4.1.A-01	C, 7
				Loss of Material	Flow-Accelerated Corrosion Program	VIII.D2.2-a	3.4.1.A-06	A
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cracking	Fatigue Monitoring Program	VIII.D2.1-c	3.4.1.A-01	C, 7
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.2-b	3.4.1.A-02	B
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	VIII.D2.1-c	3.4.1.A-01	C, 7
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.2-b	3.4.1.A-02	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-2 Steam and Power Conversion System
NMP1 Feedwater/High Pressure Coolant Injection System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.2-b	3.4.1.A-02	B
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.3-a	3.1.1.A-25	A
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A
						VIII.D2.1-c	3.4.1.A-01	C, 7
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.2-b	3.4.1.A-02	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-3 Steam and Power Conversion System
NMP1 Main Generator and Auxiliary System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	C, 11
Piping and Fittings	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Dried Air or Gas	None	None			None
			Air	Loss of Material	Systems Walkdown Program	VII.I.1-b	3.3.1.A-05	A, 1
Tanks	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Dried Air or Gas	None	None			None
Valves	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Dried Air or Gas	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-4 Steam and Power Conversion System
NMP1 Main Steam System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon Steel, Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program			G
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			G
Condensing Pots	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	IV.C1.1-h	3.1.1.A-01	C, 8
					One-Time Inspection Program Water Chemistry Control Program			Q
Flow Elements	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.C1.1-b	3.1.1.A-01	C, 3
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-a	3.1.1.A-25	C, 3

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-4 Steam and Power Conversion System
NMP1 Main Steam System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Demineralized Untreated Water, Low Flow Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J
			Treated Water or Steam, temperature ≥ 482°F	Cracking Loss of Material	Flow-Accelerated Corrosion Program Systems Walkdown Program Water Chemistry Control Program			J, 15

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-4 Steam and Power Conversion System
NMP1 Main Steam System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	V.D.2.1-e	3.2.1.A-03	A
					Systems Walkdown Program	V.E.1-b	3.2.1.A-10	A, 1
						VIII.H.1-b	3.4.1.A-05	A, 1
			Demineralized Untreated Water, Low Flow	Loss of Material	One-Time Inspection Program	V.D.2.1-e	3.2.1.A-03	A
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.C1.1-b	3.1.1.A-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-a	3.1.1.A-25	A
		Nickel Based Alloys	Air	None	None			None
		Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	IV.C1.1-h	3.1.1.A-01	A
					ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program One-Time Inspection Program Water Chemistry Control Program	IV.C1.1-I	3.1.1.A-07	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.A-4 Steam and Power Conversion System
NMP1 Main Steam System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	V.D.2.1-e	3.2.1.A-03	C, 7
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A
						VIII.B2.1-c	3.4.1.A-01	C, 7
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.3-a	3.1.1.A-25	A
						VIII.B2.2-a	3.4.1.A-06	A
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.2-b	3.4.1.A-02	B
		Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.A-29	E
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	One-Time Inspection Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.A-29	E
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.A-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.B-1 Steam and Power Conversion System
NMP2 Main Condenser Air Removal System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature < 140°F, Low Flow Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.B-2 Steam and Power Conversion System
NMP2 Condensate System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature < 140°F, Low Flow	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J
Piping and Fittings	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.B-05	A, 1
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.1-b	3.4.1.B-02	B
		Polymers	Treated Water, temperature < 140°F, Low Flow	Cracking	Preventive Maintenance Program			J
				Loss of Strength	Preventive Maintenance Program			J
		Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.B-2 Steam and Power Conversion System
NMP2 Condensate System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Tanks	NFS	Polymers	Air	Cracking	Systems Walkdown Program			M, 13
				Hardening and Shrinkage	Systems Walkdown Program			M, 13
				Loss of Strength	Systems Walkdown Program			M, 13
			Treated Water, temperature < 140°F, Low Flow	Cracking	One-Time Inspection Program			M
				Loss of Strength	One-Time Inspection Program			M
Valves	NFS	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.B-3 Steam and Power Conversion System
NMP2 Feedwater System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Bolting	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program			G
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			G
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.B-3 Steam and Power Conversion System
NMP2 Feedwater System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment (cont'd)	PFASRE	Any	Treated Water or Steam, temperature ≥ 212°F, but < 482°F Treated Water or Steam, temperature ≥ 482°F	Cracking Loss of Material	Flow-Accelerated Corrosion Program Systems Walkdown Program Water Chemistry Control Program			J, 15
Piping and Fittings	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Systems Walkdown Program	VIII.H.1-b	3.4.1.B.-05	A, 1
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	IV.C1.1-d	3.1.1.B-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-c	3.1.1.B-25	A
						VIII.D2.1-a	3.4.1.B-06	A
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.C1.1-d	3.1.1.B-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-c	3.1.1.B-25	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.B-3 Steam and Power Conversion System
NMP2 Feedwater System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves	NFS	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.B-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.3-a	3.1.1.B-25	A
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.B-01	A
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.2-b	3.4.1.B-02	B
	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.B-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.3-a	3.1.1.B-25	A
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F, Low Flow	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.B-01	A
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.2-b	3.4.1.B-02	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.B-3 Steam and Power Conversion System
NMP2 Feedwater System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.B-01	A
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.D2.2-b	3.4.1.B-02	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.B-4 Steam and Power Conversion System
NMP2 Main Steam System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
"T" Quenchers	PB	Wrought Austenitic Stainless Steel	Demineralized Untreated Water, Low Flow	Loss of Material	One-Time Inspection Program			H, 14
Bolting	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Closure Bolting for Non-Borated Water Systems with operating temperatures ≥ 212°F	Cracking	Fatigue Monitoring Program			G
				Loss of Material	ASME Section XI Inservice Inspection (Subsections IWB, IWC, IWD) Program			G
Condensing Chambers	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.C1.1-f	3.1.1.B-29	D, 9
					Fatigue Monitoring Program	IV.C1.1-h	3.1.1.B-01	C, 9
Flexible Hose	PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	V.D.2.1-b	3.2.1.B-01	A
					BWR Stress Corrosion Cracking Program Water Chemistry Control Program	V.D.2.1-c	3.2.1.B-16	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.B-4 Steam and Power Conversion System
NMP2 Main Steam System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Flow Elements	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.C1.1-b	3.1.1.B-01	C, 3
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-a	3.1.1.B-25	C, 3
NSR piping, fittings, and equipment	PFASRE	Any	Demineralized Untreated Water, Low Flow Treated Water, temperature < 140°F, Low Flow Treated Water or Steam, temperature ≥ 212°F, but < 482°F	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J
			Treated Water or Steam, temperature ≥ 482°F Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking Loss of Material	Flow-Accelerated Corrosion Program Systems Walkdown Program Water Chemistry Control Program			J, 15

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.B-4 Steam and Power Conversion System
NMP2 Main Steam System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping and Fittings	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	V.D.2.1-e	3.2.1.B-03	A
					Systems Walkdown Program	VIII.H.1-b	3.4.1.B.-05	A, 1
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.C1.1-b	3.1.1.B-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.1-a	3.1.1.B-25	A
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	IV.C1.1-b	3.1.1.B-01	A
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.B2.1-a	3.4.1.B-07	E
		Wrought Austenitic Stainless Steel	Air	None	None			None
			Demineralized Untreated Water, Low Flow	Loss of Material	One-Time Inspection Program			H, 14
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.C1.1-f	3.1.1.B-29	B
					Fatigue Monitoring Program	IV.C1.1-h	3.1.1.B-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.B-4 Steam and Power Conversion System
NMP2 Main Steam System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Restriction Orifices	FR PB	Wrought Austenitic Stainless Steel	Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.C1.1-f	3.1.1.B-29	D, 10
					Fatigue Monitoring Program	IV.C1.1-h	3.1.1.B-01	C, 10
Valves	PB	Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	One-Time Inspection Program	V.D.2.1-e	3.2.1.B-03	C, 7
			Treated Water, temperature < 140°F, Low Flow	Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.E.2-b	3.4.1.B-02	B
			Treated Water or Steam, temperature ≥ 482°F	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.B-01	A
				Loss of Material	Flow-Accelerated Corrosion Program	IV.C1.3-a	3.1.1.B-25	A
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	Fatigue Monitoring Program	IV.C1.3-d	3.1.1.B-01	A
				Loss of Material	One-Time Inspection Program Water Chemistry Control Program	VIII.B2.2-b	3.4.1.B-07	E

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.B-4 Steam and Power Conversion System
NMP2 Main Steam System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (cont'd)	PB	Wrought Austenitic Stainless Steel	Air	None	None			None
			Treated Water or Steam, temperature ≥ 482°F, Low Flow	Cracking	BWR Stress Corrosion Cracking Program Water Chemistry Control Program	IV.C1.3-c	3.1.1.B-29	B
					Fatigue Monitoring Program	IV.C1.3-d	3.1.1.B-01	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.4.2.B-5 Steam and Power Conversion System
NMP2 Moisture Separator and Reheater System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
NSR piping, fittings, and equipment	PFASRE	Any	Treated Water, temperature <140°F	Cracking Loss of Material	Systems Walkdown Program Water Chemistry Control Program			J
			Treated Water or Steam, temperature ≥ 212°F, but < 482°F Treated Water or Steam, temperature ≥ 482°F	Cracking Loss of Material	Flow-Accelerated Corrosion Program Systems Walkdown Program Water Chemistry Control Program			J, 15

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Notes for Tables 3.4.2.A-1 through 3.4.2.B-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 item for material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

D. Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.

E. Consistent with NUREG-1801 for material, environment, and aging effect, but a different aging management program is credited.

F. Material not in NUREG-1801 for this component.

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

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

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

J. Neither the component nor the material and environment combination is evaluated in NUREG-1801.

K. Material and environment not in NUREG-1801 for this component and aging effect.

L. Aging effect and environment not in NUREG-1801 for this component and material.

M. Aging effect and material not in NUREG-1801 for this component and environment.

N. Aging effect, material, and environment not in NUREG-1801 for this component.

P. Component and aging effect not in NUREG-1801 for this material and environment.

Q. Component not in NUREG-1801 for this material, environment, and aging effect.

(Note “O” was not used to avoid confusion with the number zero)

Plant Specific Notes:

1. This row applies to the external surfaces of carbon steel components.
2. Flow gauges are not identified in NUREG-1801 for this GALL row number.
3. Flow elements are not identified in NUREG-1801 for this GALL row number.
4. Filters/strainers are not identified in NUREG-1801 for this GALL row number.
5. Flow orifices are not identified in NUREG-1801 for this GALL row number.
6. Feedwater pumps are not identified in NUREG-1801 for this GALL row number.
7. Valves are not identified in NUREG-1801 for this GALL row number.
8. Condensing pots are not identified in NUREG-1801 for this GALL row number.
9. Condensing chambers are not identified in NUREG-1801 for this GALL row number.

10. Restriction orifices are not identified in NUREG-1801 for this GALL row number.

11. Bolting is not identified in NUREG-1801 for this GALL row number.

12. Flow indicators are not identified in NUREG-1801 for this GALL row number.

13. This row applies to the external surfaces of components made of polymers.

14. This row applies to components that have an aging effect/mechanism of loss of material due to microbiologically influenced corrosion.

15. The Flow Accelerated Corrosion Program only applies to the aging effect of loss of material.

3.5 AGING MANAGEMENT OF STRUCTURES AND COMPONENT SUPPORTS

3.5.1 INTRODUCTION

This section provides the results of the aging management review for those components identified in Section 2.4, Structures and Component Supports, as being subject to aging management review. The structures, or portions of structures, which are addressed in this section, are described in the indicated sections.

NMP1

- NMP1 Primary Containment Structure (Section 2.4.A.1)
- NMP1 Reactor Building (Section 2.4.A.2)
- NMP1 Essential Yard Structures (Section 2.4.A.3)
- NMP1 Fuel Handling System (Section 2.4.A.4)
- NMP1 Material Handling System (Section 2.4.A.5)
- NMP1 Offgas Building (Section 2.4.A.6)
- NMP1 Radwaste Solidification and Storage Building (Section 2.4.A.8)
- NMP1 Screen and Pump House Building (Section 2.4.A.9)
- NMP1 Turbine Building (Section 2.4.A.10)
- NMP1 Vent Stack (Section 2.4.A.11)
- NMP1 Waste Disposal Building (Section 2.4.A.12)

NMP2

- NMP2 Primary Containment Structure (Section 2.4.B.1)
- NMP2 Reactor Building (Section 2.4.B.2)
- NMP2 Auxiliary Service Building (Section 2.4.B.3)

- NMP2 Control Room Building (Section 2.4.B.4)
- NMP2 Diesel Generator Building (Section 2.4.B.5)
- NMP2 Essential Yard Structures (Section 2.4.B.6)
- NMP2 Fuel Handling System (Section 2.4.B.7)
- NMP2 Main Stack (Section 2.4.B.8)
- NMP2 Material Handling System (Section 2.4.B.9)
- NMP2 Radwaste Building (Section 2.4.B.11)
- NMP2 Screenwell Building (Section 2.4.B.12)
- NMP2 Standby Gas Treatment Building (Section 2.4.B.13)
- NMP2 Turbine Building (Section 2.4.B.14)

Commodities

- Component Supports (Section 2.4.C.1)
- Fire Stops and Seals (Section 2.4.C.2)

Tables 3.5.1.A, NMP1 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapters II and III of NUREG-1801, and 3.5.1.B, NMP2 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapters II and III of NUREG-1801, provide the summary of the programs evaluated in NUREG-1801 for the Structures and Component Supports that are relied on for license renewal.

These tables use the format described in Section 3.0. Note that these tables only include results for those component groups that are applicable to a BWR.

3.5.2 RESULTS

The following tables summarize the results of the aging management review for the Structures and Component Supports.

NMP1

- Table 3.5.2.A-1 Structures and Component Supports - NMP1 Primary Containment Structure – Summary of Aging Management Evaluation
- Table 3.5.2.A-2 Structures and Component Supports - NMP1 Reactor Building – Summary of Aging Management Evaluation
- Table 3.5.2.A-3 Structures and Component Supports - NMP1 Essential Yard Structures – Summary of Aging Management Evaluation
- Table 3.5.2.A-4 Structures and Component Supports - NMP1 Fuel Handling System – Summary of Aging Management Evaluation
- Table 3.5.2.A-5 Structures and Component Supports - NMP1 Material Handling System – Summary of Aging Management Evaluation
- Table 3.5.2.A-6 Structures and Component Supports - NMP1 Offgas Building – Summary of Aging Management Evaluation
- Table 3.5.2.A-7 Structures and Component Supports - NMP1 Radwaste Solidification and Storage Building – Summary of Aging Management Evaluation
- Table 3.5.2.A-8 Structures and Component Supports - NMP1 Screen and Pump House Building – Summary of Aging Management Evaluation
- Table 3.5.2.A-9 Structures and Component Supports - NMP1 Turbine Building – Summary of Aging Management Evaluation
- Table 3.5.2.A-10 Structures and Component Supports - NMP1 Vent Stack – Summary of Aging Management Evaluation
- Table 3.5.2.A-11 Structures and Component Supports - NMP1 Waste Disposal Building – Summary of Aging Management Evaluation

NMP2

- Table 3.5.2.B-1 Structures and Component Supports - NMP2 Primary Containment Structure – Summary of Aging Management Evaluation
- Table 3.5.2.B-2 Structures and Component Supports - NMP2 Reactor Building – Summary of Aging Management Evaluation
- Table 3.5.2.B-3 Structures and Component Supports - NMP2 Auxiliary Service Building – Summary of Aging Management Evaluation
- Table 3.5.2.B-4 Structures and Component Supports - NMP2 Control Room Building – Summary of Aging Management Evaluation
- Table 3.5.2.B-5 Structures and Component Supports - NMP2 Diesel Generator Building – Summary of Aging Management Evaluation
- Table 3.5.2.B-6 Structures and Component Supports - NMP2 Essential Yard Structures – Summary of Aging Management Evaluation
- Table 3.5.2.B-7 Structures and Component Supports - NMP2 Fuel Handling System – Summary of Aging Management Evaluation
- Table 3.5.2.B-8 Structures and Component Supports - NMP2 Main Stack – Summary of Aging Management Evaluation
- Table 3.5.2.B-9 Structures and Component Supports - NMP2 Material Handling System – Summary of Aging Management Evaluation
- Table 3.5.2.B-10 Structures and Component Supports - NMP2 Radwaste Building – Summary of Aging Management Evaluation
- Table 3.5.2.B-11 Structures and Component Supports - NMP2 Screenwell Building – Summary of Aging Management Evaluation
- Table 3.5.2.B-12 Structures and Component Supports - NMP2 Standby Gas Treatment Building – Summary of Aging Management Evaluation
- Table 3.5.2.B-13 Structures and Component Supports - NMP2 Turbine Building – Summary of Aging Management Evaluation

Commodities

- Table 3.5.2.C-1 Structures and Component Supports - Component Supports – Summary of Aging Management Evaluation

- Table 3.5.2.C-2 Structures and Component Supports - Fire Stops and Seals – Summary of Aging Management Evaluation

The materials from which specific components are fabricated, the environments to which components are exposed, the aging effects requiring management, and the aging management programs used to manage these aging effects are provided for each of the above structures in the following subsections of Section 3.5.2.A, NMP1 Materials, Environments, Aging Effects Requiring Management and Aging Management Programs, Section 3.5.2.B, NMP2 Materials, Environments, Aging Effects Requiring Management and Aging Management Programs, and Section 3.5.2.C, Commodity Materials, Environments, Aging Effects Requiring Management and Aging Management Programs:

NMP1

- Section 3.5.2.A.1, NMP1 Primary Containment Structure

- Section 3.5.2.A.2, NMP1 Reactor Building

- Section 3.5.2.A.3, NMP1 Essential Yard Structures

- Section 3.5.2.A.4, NMP1 Fuel Handling System

- Section 3.5.2.A.5, NMP1 Material Handling System

- Section 3.5.2.A.6, NMP1 Offgas Building

- Section 3.5.2.A.7, NMP1 Radwaste Solidification and Storage Building

- Section 3.5.2.A.8, NMP1 Screen and Pump House Building

- Section 3.5.2.A.9, NMP1 Turbine Building

- Section 3.5.2.A.10, NMP1 Vent Stack

- Section 3.5.2.A.11, NMP1 Waste Disposal Building

NMP2

- Section 3.5.2.B.1, NMP2 Primary Containment Structure
- Section 3.5.2.B.2, NMP2 Reactor Building
- Section 3.5.2.B.3, NMP2 Auxiliary Service Building
- Section 3.5.2.B.4, NMP2 Control Room Building
- Section 3.5.2.B.5, NMP2 Diesel Generator Building
- Section 3.5.2.B.6, NMP2 Essential Yard Structures
- Section 3.5.2.B.7, NMP2 Fuel Handling System
- Section 3.5.2.B.8, NMP2 Main Stack
- Section 3.5.2.B.9, NMP2 Material Handling System
- Section 3.5.2.B.10, NMP2 Radwaste Building
- Section 3.5.2.B.11, NMP2 Screenwell Building
- Section 3.5.2.B.12, NMP2 Standby Gas Treatment Building
- Section 3.5.2.B.13, NMP2 Turbine Building

Commodities

- Section 3.5.2.C.1, Component Supports
- Section 3.5.2.C.2, Fire Stops and Seals

3.5.2.A NMP1 MATERIALS, ENVIRONMENTS, AGING EFFECTS REQUIRING MANAGEMENT AND AGING MANAGEMENT PROGRAMS

3.5.2.A.1 NMP1 PRIMARY CONTAINMENT STRUCTURE

Materials

The materials of construction for the NMP1 Primary Containment Structure components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength $\geq$ 100 Ksi)
- Concrete
- Polymers
- Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Primary Containment Structure components are exposed to the following environments:

- Air
- Air, relative motion between components
- Demineralized Untreated Water

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Primary Containment Structure, require management:

- Cracking
- Hardening and Shrinkage

- Loss of Anchor Capacity
- Loss of Leak Tightness
- Loss of Material
- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Primary Containment Structure components:

- 10 CFR 50 appendix J Program
- ASME Section XI Inservice inspection (Subsection IWE) Program
- One-Time Inspection Program
- Structures Monitoring Program
- Torus Corrosion Monitoring Program
- Water Chemistry Control Program

3.5.2.A.2 NMP1 REACTOR BUILDING

Materials

The materials of construction for the NMP1 Reactor Building components are:

- Boraflex
- Boral
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Concrete
- Masonry Walls
- Polymers

- Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Reactor Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Soil, above the water table
- Soil, below the water table
- Treated Water, temperature < 140°F, gamma irradiation
- Treated Water, temperature < 140°F, low flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Reactor Building, require management:

- Change in Dimensions
- Cracking
- Hardening and Shrinkage
- Loss of Anchor Capacity
- Loss of Material
- Loss of Neutron Absorbing Capacity
- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Reactor Building components:

- ASME Section XI Inservice Inspection (Subsection IWF) Program
- Boraflex Monitoring Program
- Fire Protection Program
- Masonry Wall Program
- Structures Monitoring Program

3.5.2.A.3 NMP1 ESSENTIAL YARD STRUCTURES

Materials

The materials of construction for the NMP1 Essential Yard Structures components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Concrete
- Polymers

Environments

The NMP1 Essential Yard Structures components are exposed to the following environments:

- Air
- Air, relative motion between components
- Soil, above the water table
- Soil, below the water table

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Essential Yard Structures, require management:

- Cracking
- Hardening and Shrinkage
- Loss of Material
- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Essential Yard Structures components:

- Fire Protection Program
- Structures Monitoring Program

3.5.2.A.4 NMP1 FUEL HANDLING SYSTEM

Materials

The materials of construction for the NMP1 Fuel Handling System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Wrought Austenitic Stainless Steel

Environment

The NMP1 Fuel Handling System components are exposed to the following environment:

- Treated Water, temperature < 140°F, low flow

Aging Effect Requiring Management

There are no aging effects, associated with the NMP1 Fuel Handling System components that require management.

Aging Management Program

Since there are no aging effects, associated with the NMP1 Fuel Handling System components, that require management, no aging management programs are required for license renewal for the NMP1 Fuel Handling System components.

3.5.2.A.5 NMP1 MATERIAL HANDLING SYSTEM

Material

The material of construction for the NMP1 Material Handling System components is:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron

Environment

The NMP1 Material Handling System components are exposed to the following environment:

- Air

Aging Effect Requiring Management

The following aging effect, associated with the NMP1 Material Handling System, requires management:

- Loss of Material

Aging Management Program

The following aging management program manages the aging effect for the NMP1 Material Handling System components:

- Inspection of Overhead Heavy Load and Light Load Handling Systems Programs

3.5.2.A.6 NMP1 OFFGAS BUILDING

Materials

The materials of construction for the NMP1 Offgas Building components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Concrete
- Masonry Walls
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Offgas Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Soil, above the water table
- Soil, below the water table

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Offgas Building, require management:

- Cracking
- Loss of Anchor Capacity
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Offgas Building components:

- Fire Protection Program
- Masonry Wall Program
- Structures Monitoring Program

3.5.2.A.7 NMP1 RADWASTE SOLIDIFICATION AND STORAGE BUILDING

Materials

The materials of construction for the NMP1 Radwaste Solidification and Storage Building components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Concrete
- Masonry Walls
- Polymers

Environments

The NMP1 Radwaste Solidification and Storage Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Soil, above the water table
- Soil, below the water table

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Radwaste Solidification and Storage Building, require management:

- Cracking
- Hardening and Shrinkage
- Loss of Material
- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Radwaste Solidification and Storage Building components:

- Fire Protection Program
- Masonry Wall Program
- Structures Monitoring Program

3.5.2.A.8 NMP1 SCREEN AND PUMP HOUSE BUILDING

Materials

The materials of construction for the NMP1 Screen and Pump House Building components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Concrete
- Masonry Walls

Environments

The NMP1 Screen and Pump House Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Raw Water
- Soil, above the water table
- Soil, below the water table

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Screen and Pump House Building, require management:

- Cracking
- Loss of Anchor Capacity
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Screen and Pump House Building components:

- Fire Protection Program
- Masonry Wall Program
- Structures Monitoring Program

3.5.2.A.9 NMP1 TURBINE BUILDING

Materials

The materials of construction for the NMP1 Turbine Building components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Concrete
- Masonry Walls

Environments

The NMP1 Turbine Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Soil, above the water table
- Soil, below the water table

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Turbine Building, require management:

- Cracking
- Loss of Anchor Capacity
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Turbine Building components:

- Fire Protection Program
- Masonry Wall Program
- Structures Monitoring Program

3.5.2.A.10 NMP1 VENT STACK

Materials

The materials of construction for the NMP1 Vent Stack components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Concrete

Environments

The NMP1 Vent Stack components are exposed to the following environments:

- Air
- Soil, below the water table

Aging Effect Requiring Management

The following aging effect, associated with the NMP1 Vent Stack, requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effect for the NMP1 Vent Stack components:

- Fire Protection Program
- Structures Monitoring Program

3.5.2.A.11 NMP1 WASTE DISPOSAL BUILDING

Materials

The materials of construction for the NMP1 Waste Disposal Building components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Concrete
- Masonry Walls
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP1 Waste Disposal Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Soil, above the water table
- Soil, below the water table

Aging Effects Requiring Management

The following aging effects, associated with the NMP1 Waste Disposal Building, require management:

- Cracking
- Hardening and Shrinkage
- Loss of Anchor Capacity
- Loss of Material

- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP1 Waste Disposal Building components:

- Fire Protection Program
- Masonry Wall Program
- Structures Monitoring Program

3.5.2.B NMP2 MATERIALS, ENVIRONMENTS, AGING EFFECTS REQUIRING MANAGEMENT AND AGING MANAGEMENT PROGRAMS

3.5.2.B.1 NMP2 PRIMARY CONTAINMENT STRUCTURE

Materials

The materials of construction for the NMP2 Primary Containment Structure components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Concrete
- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels
- Polymers
- Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Primary Containment Structure components are exposed to the following environments:

- Air
- Air, relative motion between components
- Demineralized Untreated Water, Low Flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Primary Containment Structure, require management:

- Cracking
- Hardening and Shrinkage
- Loss of Leak Tightness
- Loss of Material
- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Primary Containment Structure components:

- 10 CFR 50 Appendix J Program
- ASME Section XI Inservice Inspection (Subsection IWE) Program
- ASME Section XI Inservice Inspection (Subsection IWL) Program
- Structures Monitoring Program

3.5.2.B.2 NMP2 REACTOR BUILDING

Materials

The materials of construction for the NMP2 Reactor Building components are:

- Boral
- Boraflex
- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)

- Concrete
- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels
- Polymers
- Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Reactor Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Soil, above the water table
- Soil, below the water table
- Treated Water, temperature < 140°F, gamma irradiation
- Treated Water, temperature < 140°F, low flow

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Reactor Building, require management:

- Change in Dimensions
- Cracking
- Hardening and Shrinkage
- Loss of Anchor Capacity
- Loss of Material
- Loss of Neutron Absorbing Capacity

- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Reactor Building components:

- Boraflex Monitoring Program
- Fire Protection Program
- Structures Monitoring Program

3.5.2.B.3 NMP2 AUXILIARY SERVICE BUILDING

Materials

The materials of construction for the NMP2 Auxiliary Service Building components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Concrete

Environments

The NMP2 Auxiliary Service Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Soil, above the water table
- Soil, below the water table

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Auxiliary Service Building, requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effect for the NMP2 Auxiliary Service Building components:

- Fire Protection Program
- Structures Monitoring Program

3.5.2.B.4 NMP2 CONTROL ROOM BUILDING

Materials

The materials of construction for the NMP2 Control Room Building components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Concrete

Environments

The NMP2 Control Room Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Soil, above the water table
- Soil, below the water table

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Control Room Building, require management:

- Loss of Anchor Capacity
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Control Room Building components:

- Fire Protection Program
- Structures Monitoring Program

3.5.2.B.5 NMP2 DIESEL GENERATOR BUILDING

Materials

The materials of construction for the NMP2 Diesel Generator Building components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Concrete
- Polymers

Environments

The NMP2 Diesel Generator Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Soil, above the water table
- Soil, below the water table

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Diesel Generator Building, require management:

- Cracking
- Hardening and Shrinkage
- Loss of Anchor Capacity
- Loss of Material
- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Diesel Generator Building components:

- Fire Protection Program
- Structures Monitoring Program

3.5.2.B.6 NMP2 ESSENTIAL YARD STRUCTURES

Materials

The materials of construction for the NMP2 Essential Yard Structures components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Concrete
- Earth
- Gray Cast Iron
- Polymers
- Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon

- Stones or large rocks
- Wood
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Essential Yard Structures components are exposed to the following environments:

- Air
- Air, relative motion between components
- Soil, above the water table
- Soil, below the water table

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Essential Yard Structures, require management:

- Cracking
- Hardening and Shrinkage
- Loss of Anchor Capacity
- Loss of Form
- Loss of Material
- Loss of Material Properties
- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Essential Yard Structures components:

- Fire Protection Program
- Structures Monitoring Program

3.5.2.B.7 NMP2 FUEL HANDLING SYSTEM

Materials

The materials of construction for the NMP2 Fuel Handling System components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Fuel Handling System components are exposed to the following environments:

- Air
- Treated Water, temperature < 140°F, low flow

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Fuel Handling System, requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effect for the NMP2 Fuel Handling System components:

- Inspection of Overhead Heavy Load and Light Load Handling Systems Program
- Structures Monitoring Program

3.5.2.B.8 NMP2 MAIN STACK

Materials

The materials of construction for the NMP2 Main Stack components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Concrete

Environments

The NMP2 Main Stack components are exposed to the following environments:

- Air
- Soil, above the water table
- Soil, below the water table

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Main Stack, require management:

- Loss of Anchor Capacity
- Loss of Material

Aging Management Program

The following aging management program manages the aging effects for the NMP2 Main Stack components:

- Structures Monitoring Program

3.5.2.B.9 NMP2 MATERIAL HANDLING SYSTEM

Material

The material of construction for the NMP2 Material Handling System components is:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron

Environment

The NMP2 Material Handling System component is exposed to the following environment:

- Air

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Material Handling System, requires management:

- Loss of Material

Aging Management Program

The following aging management program manages the aging effect for the NMP2 Material Handling System components:

- Inspection of Overhead Heavy Load and Light Load Handling Systems Program

3.5.2.B.10 NMP2 RADWASTE BUILDING

Materials

The materials of construction for the NMP2 Radwaste Building components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Concrete

Environments

The NMP2 Radwaste Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Soil, above the water table
- Soil, below the water table

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Radwaste Building, require management:

- Loss of Anchor Capacity
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Radwaste Building components:

- Fire Protection Program
- Structures Monitoring Program

3.5.2.B.11 NMP2 SCREENWELL BUILDING

Materials

The materials of construction for the NMP2 Screenwell Building components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Concrete
- Masonry Walls
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Screenwell Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Raw Water
- Soil, above the water table
- Soil, below the water table
- Undisturbed Soil

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Screenwell Building, require management:

- Cracking
- Loss of Anchor Capacity

- Loss of Material

- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Screenwell Building components:

- Fire Protection Program

- Masonry Wall Program

- Structures Monitoring Program

3.5.2.B.12 NMP2 STANDBY GAS TREATMENT BUILDING

Materials

The materials of construction for the NMP2 Standby Gas Treatment Building components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron

- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)

- Concrete

Environments

The NMP2 Standby Gas Treatment Building components are exposed to the following environments:

- Air

- Air, relative motion between components

- Soil, above the water table

- Soil, below the water table

Aging Effect Requiring Management

The following aging effect, associated with the NMP2 Standby Gas Treatment Building, requires management:

- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effect for the NMP2 Standby Gas Treatment Building components:

- Fire Protection Program
- Structures Monitoring Program

3.5.2.B.13 NMP2 TURBINE BUILDING

Materials

The materials of construction for the NMP2 Turbine Building components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Concrete
- Masonry Walls
- Wrought Austenitic Stainless Steel

Environments

The NMP2 Turbine Building components are exposed to the following environments:

- Air
- Air, relative motion between components
- Soil, above the water table

- Soil, below the water table

Aging Effects Requiring Management

The following aging effects, associated with the NMP2 Turbine Building, require management:

- Cracking
- Loss of Anchor Capacity
- Loss of Material

Aging Management Programs

The following aging management programs manage the aging effects for the NMP2 Turbine Building components:

- Fire Protection Program
- Masonry Wall Program
- Structures Monitoring Program

3.5.2.C COMMODITY MATERIALS, ENVIRONMENTS, AGING EFFECTS REQUIRING MANAGEMENT AND AGING MANAGEMENT PROGRAMS[1]

3.5.2.C.1 COMPONENT SUPPORTS

Materials

The materials of construction for the Component Supports components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)
- Copper Alloys (Zinc <15%) (NMP1 only)
- Copper Alloys (Zinc ≥ 15%) and Aluminum Bronze (NMP2 only)
- Epoxy Grout (NMP2 only)
- Grout
- Martensitic, Precipitation Hardenable, and Superferritic Stainless Steel
- Polymers
- Wrought Austenitic Stainless Steel

Environments

The Component Supports components are exposed to the following environments:

- Air
- Air, relative motion between components
- Air with vibratory motion
- Soil, above the water table (NMP2 only)
- Treated Water, temperature < 140°F, low flow

[1] The information in this section applies to NMP1 and NMP2, unless specifically noted.

Aging Effects Requiring Management

The following aging effects, associated with the Component Supports, require management:

- Cracking
- Hardening and Shrinkage
- Loss of Anchor Capacity
- Loss of Material
- Loss of Strength

Aging Management Programs

The following aging management programs manage the aging effects for the Component Supports components:

- ASME Section XI Inservice Inspection (Subsection IWF) Program
- Structures Monitoring Program

3.5.2.C.2 FIRE STOPS AND SEALS

Materials

The materials of construction for the Fire Stops and Seals components are:

- Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron (NMP2 only)
- Fire Stop
- Fire Wrap
- Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon (NMP1 only)
- Wrought Austenitic Stainless Steel

Environment

The Fire Stops and Seals components are exposed to the following environment:

- Air

Aging Effects Requiring Management

The following aging effects, associated with the Fire Stops and Seals, require management:

- Cracking/Delamination
- Loss of Material
- Separation

Aging Management Program

The following aging management program manages the aging effects for the Fire Stops and Seals components:

- Fire Protection Program

3.5.3 TIME-LIMITED AGING ANALYSES

There are no Time-Limited Aging Analyses (TLAAs) credited for aging management for the Structures and Component Supports identified in Table 3.5.1.A and Table 3.5.1.B. Other TLAAs associated with the Structures and Component Supports are discussed in Section 4.6, "Containment Liner Plate, Metal Containment & Penetrations Fatigue Analysis," and Section 4.7.1, "RPV Biological Shield (NMP2 only)."

3.5.4 CONCLUSIONS

The Structures and Component Supports that are subject to aging management review have been identified in accordance with the requirements of 10 CFR 54.4. The aging management programs selected to manage aging effects for the Structures and Component Supports are identified in the summary tables and Section 3.5.2. A description of these aging management programs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation. Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the Structures and

Component Supports 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.A NMP1 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
Common Components of All Types of PWR and BWR Containment					
3.5.1.A-01	Penetration sleeves, penetration bellows, and dissimilar metal welds	Cumulative fatigue damage (CLB fatigue analysis exists)	TLAA evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Not applicable, because the maximum operating temperature of these components is insufficient to cause the magnitude of thermal cycles necessary for fatigue. Fatigue analysis is not required for these components in accordance with the NMP1 USAR Section XVI.B.2.8.5.
3.5.1.A-02	Penetration sleeves, penetration bellows, and dissimilar metal welds	Cracking for cyclic loading & crack initiation and growth from SCC	Containment Inservice Inspection (ISI) and containment leak rate test	Yes, detection of aging effects should be further evaluated	The specified aging effect/mechanism is not applicable for these components at NMP1 based on the following: • The maximum operating temperature of these components is insufficient to allow the magnitude of thermal cycles necessary for cracking due to cyclic loading (fatigue). • The drywell and suppression pool penetration sleeves, with the exception of the Control Rod Drive penetrations, are low strength carbon/low alloy steel, which is not susceptible to SCC, in the drywell or suppression pool environment. • The CRD penetration sleeves are not exposed to a moist environment, which is required for SCC.

Table 3.5.1.A NMP1 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
Common Components of All Types of PWR and BWR Containment					
3.5.1.A-03	Penetration sleeves, penetration bellows, and dissimilar metal welds	Loss of material due to corrosion	Containment ISI and Containment leak rate test	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.23). NMP1 also credits the Water Chemistry Program (Appendix B2.1.2) for Carbon and Low Alloy Steel in a Demineralized Untreated Water, Low Flow environment.
3.5.1.A-04	Personnel airlock and equipment hatch	Loss of material due to corrosion	Containment ISI and Containment leak rate test	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.23).
3.5.1.A-05	Personnel airlock and equipment hatch	Loss of leak tightness in closed position due to mechanical wear of locks, hinges and closure mechanisms	Containment leak rate test and plant technical specifications	No	Consistent with NUREG-1801.
3.5.1.A-06	Seals, gaskets, and moisture barriers	Loss of sealant and leakage through containment due to deterioration of joint seals, gaskets, and moisture barriers	Containment ISI and containment leak rate test	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.23).

Table 3.5.1.A NMP1 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
PWR Concrete (Reinforced and Prestressed) and Steel Containments **BWR Concrete (Mark II and III) Containment and Steel (Mark I, II and III) Containment** (Note: NMP1 has a Mark I Containment)					
3.5.1.A-07	Concrete elements: foundation, dome, and wall	Aging of accessible and inaccessible concrete areas due to leaching of calcium hydroxide, aggressive chemical attack, and corrosion of embedded steel	Containment ISI	Yes, if aging mechanism is significant for inaccessible areas	Not applicable, because NMP1 has a Mark I Containment.
3.5.1.A-08	Concrete elements: foundation	Cracks, distortion, and increases in component stress level due to settlement	Structures monitoring	No, if within the scope of the applicant's structures monitoring program	Not applicable, because NMP1 has a Mark I Containment.

Table 3.5.1.A NMP1 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
PWR Concrete (Reinforced and Prestressed) and Steel Containments **BWR Concrete (Mark II and III) Containment and Steel (Mark I, II and III) Containment** (Note: NMP1 has a Mark I Containment)					
3.5.1.A-09	Concrete elements: foundation	Reduction in foundation strength due to erosion of porous concrete subfoundation	Structures monitoring	No, if within the scope of the applicant's structures monitoring program	Not applicable, because NMP1 has a Mark I Containment.
3.5.1.A-10	Concrete elements: foundation, dome, and wall	Reduction of strength and modulus due to elevated temperature	Plant-specific	Yes, for any portions of concrete containment that exceed specified temperature limits	Not applicable, because NMP1 has a Mark I Containment.
3.5.1.A-11	Prestressed containment: tendons and anchorage components	Loss of prestress due to relaxation, shrinkage, creep, and elevated temperature	TLAA evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Not applicable, because NMP1 has a Mark I Containment.

Table 3.5.1.A NMP1 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
PWR Concrete (Reinforced and Prestressed) and Steel Containments **BWR Concrete (Mark II and III) Containment and Steel (Mark I, II and III) Containment** (Note: NMP1 has a Mark I Containment)					
3.5.1.A-12	Steel elements: liner plate and containment shell	Loss of material due to corrosion in accessible and inaccessible areas	Containment ISI and containment leak rate test	Yes, if corrosion is significant for inaccessible areas	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.23). Additionally, expansion joints, piping and valves are consistent with, but not identified in, NUREG-1801. NMP1 also credits the Water Chemistry Program (Appendix B2.1.2) and the Torus Corrosion Monitoring Program (Appendix B3.3) for Carbon and Low Alloy Steel in Demineralized Untreated Water, Low Flow environment. Inaccessible areas are compared against accessible areas and where warranted, additional inspections are performed.
3.5.1.A-13	Steel elements: vent header, drywell head, torus, downcomers, and pool shell	Cumulative Fatigue damage (CLB fatigue analysis exists)	TLAA evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Not applicable, because the maximum operating temperature of these components is insufficient to allow the magnitude of thermal cycles necessary for fatigue. See Section 3.5.3 for further discussion on Time-Limited Aging Analyses.

Table 3.5.1.A NMP1 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
PWR Concrete (Reinforced and Prestressed) and Steel Containments **BWR Concrete (Mark II and III) Containment and Steel (Mark I, II and III) Containment** (Note: NMP1 has a Mark I Containment)					
3.5.1.A-14	Steel elements: protected by coating	Loss of material due to corrosion in accessible areas only	Protective coating monitoring and maintenance	No	Not applicable, because coatings are not credited with managing aging at NMP1.
3.5.1.A-15	Prestressed containment: tendons and anchorage components	Loss of material due to corrosion of prestressing tendons and anchorage components	Containment ISI	No	Not applicable, because NMP1 has a Mark I Containment.
3.5.1.A-16	Concrete elements: foundation, dome, and wall	Scaling, cracking, and spalling due to freeze-thaw; expansion and cracking due to reaction with aggregate	Containment ISI	No	Not applicable, because NMP1 has a Mark I Containment.

Table 3.5.1.A NMP1 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
PWR Concrete (Reinforced and Prestressed) and Steel Containments **BWR Concrete (Mark II and III) Containment and Steel (Mark I, II and III) Containment** (Note: NMP1 has a Mark I Containment)					
3.5.1.A-17	Steel elements: vent line bellows, vent headers, and downcomers	Cracking due to cyclic loads; crack initiation and growth due to SCC	Containment ISI and Containment leak rate test	Yes, detection of aging effects is to be evaluated	The specified aging effect/mechanism is not applicable for these components at NMP1 based on the following: • The maximum operating temperature of these components is insufficient to allow the magnitude of thermal cycles necessary for cracking due to cyclic loading (fatigue). • Vent line bellows are not normally wetted, so they are not susceptible to SCC. • Other components are low strength carbon/low alloy steel, which is not susceptible to SCC in the drywell or suppression pool environment.
3.5.1.A-18	Steel elements: suppression chamber liner	Crack initiation and growth due to SCC	Containment ISI and containment leak rate test	No	Not applicable, because NMP1 has a Mark I Containment.

Table 3.5.1.A NMP1 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
PWR Concrete (Reinforced and Prestressed) and Steel Containments **BWR Concrete (Mark II and III) Containment and Steel (Mark I, II and III) Containment** (Note: NMP1 has a Mark I Containment)					
3.5.1.A-19	Steel elements: drywell head and downcomer pipes	Fretting and lock up due to wear	Containment ISI	No	Not applicable for these components, since the environment causing the aging effect/mechanism is not applicable to NMP1, based on the following: • The Drywell head does not experience a relative motion environment that would cause wear or fretting. • Wear of bolting components during boltup or bolt removal is prevented by proper maintenance practices, thus it is not considered an aging issue. • Downcomer pipes are not subject to relative motion that would cause wear or fretting.

Table 3.5.1.A NMP1 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
Class I Structures					
3.5.1.A-20	All Groups except Group 6: accessible interior/ exterior concrete and steel components	All types of aging effects	Structures monitoring	No, if within the scope of the applicant's structures monitoring program	Consistent with NUREG-1801 for steel components except that the Vent Stack steel components are not identified in NUREG-1801. Additionally, NMP1 credits the ASME Section XI, Subsection IWE Program (Appendix B2.1.23), in lieu of the Structures Monitoring Program, to manage loss of material of high strength structural fasteners in demineralized untreated water. Not applicable for concrete components. There is no aging effect requiring management for concrete components because NMP1 was designed and constructed to recognized codes and standards for reinforced concrete structures. Nonetheless, NMP1 credits the Structures Monitoring Program (Appendix B2.1.28) to monitor the condition of the structures.

Table 3.5.1.A NMP1 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
Class I Structures					
3.5.1.A-21	Groups 1-3, 5, 7-9: inaccessible concrete components, such as exterior walls below grade and foundation	Aging of inaccessible concrete areas due to aggressive chemical attack, and corrosion of embedded steel	Plant specific	Yes, if an aggressive below-grade environment exists	Not applicable because ground water test data confirms that a below grade aggressive environment does not exist. Additionally, there is no aging effect requiring management for concrete components above grade because NMP1 was designed and constructed to recognized codes and standards for reinforced concrete structures. Nonetheless, NMP1 credits the Structures Monitoring Program (Appendix B2.1.28) for these components.
3.5.1.A-22	Group 6: all accessible/ Inaccessible concrete, steel, and earthen components	All types of aging effects, including loss of material due to abrasion, cavitation, and corrosion	Inspection of water-control structures or FERC/US Army Corp of Engineers dam inspection and maintenance	No	Not applicable, because there are no water-control structures at NMP1. The earthen structures, which provide flood protection to the site, are included in the NMP2 Essential Yard Structures (Table 3.5.2.B-6).
3.5.1.A-23	Group 5: liners	Crack initiation and growth due to SCC; loss of material due to crevice corrosion	Water chemistry and monitoring of spent fuel pool water level	No	Not applicable, because the spent fuel pool has an environment of low temperature treated water, in which stainless steel is not susceptible to SCC.
3.5.1.A-24	Groups 1-3, 5, 6: all masonry block walls	Cracking due to restraint, shrinkage, creep, and aggressive environment	Masonry wall	No	Consistent with NUREG-1801.

Table 3.5.1.A NMP1 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
Class I Structures					
3.5.1.A-25	Groups 1-3, 5, 7-9: foundation	Cracks, distortion, and increases in component stress level due to settlement	Structures monitoring	No, if within the scope of the applicant's structures monitoring program	Not applicable, because settlement is not an aging effect requiring management for NMPNS. The structures at NMPNS are founded on impervious rock. Nonetheless, NMP1 credits the Structures Monitoring Program (Appendix B2.1.28) for these components.
3.5.1.A-26	Groups 1-3, 5-9: foundation	Reduction in foundation strength due to erosion of porous concrete subfoundation	Structures monitoring	No, if within the scope of the applicant's structures monitoring program	Not applicable, because NMP1 does not have porous concrete.
3.5.1.A-27	Groups 1-5: Concrete	Reduction of strength and modulus due to elevated temperature	Plant specific	Yes, for any portions of concrete that exceed specified temperature limits	Not applicable, because the operating temperatures to which the NMP1 structures are exposed are not sufficient to result in the aging effect/mechanism for these components.
3.5.1.A-28	Groups 7, 8: liners	Crack Initiation and growth due to SCC; loss of material due to crevice corrosion	Plant specific	Yes	Not applicable, because the plant-specific IPA identified no tank liners that are subject to aging management review.

Table 3.5.1.A NMP1 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
Component Supports					
3.5.1.A-29	All Groups: support members: anchor bolts, concrete surrounding anchor bolts, welds, grout pad, bolted connections, etc.	Aging of component supports	Structures monitoring	No, if within the scope of the applicant's structures monitoring program	Consistent with NUREG-1801
3.5.1.A-30	Groups B1.1, B1.2, and B1.3: support members: anchor bolts and welds	Cumulative fatigue damage (CLB fatigue analysis exists)	TLAA evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Not applicable, because the maximum operating temperature of these components is insufficient to allow the magnitude of thermal cycles necessary for fatigue. See Section 3.5.3 for further discussion on TLAAs.
3.5.1.A-31	PWR only				
3.5.1.A-32	Groups B1.1, B1.2, and B1.3: support members: anchor bolts, welds, spring hangers, guides, stops, and vibration isolators	Loss of material due to environmental corrosion; loss of mechanical function due to corrosion, distortion, dirt, overload, etc.	ISI	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.25).
3.5.1.A-33	Group B1.1: high strength low-alloy bolts	Crack initiation and growth due to SCC	Bolting integrity	No	Not applicable, because structural high-strength bolts are not exposed to enough moisture to cause SCC.

Table 3.5.1.B NMP2 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
Common Components of All Types of PWR and BWR Containment					
3.5.1.B-01	Penetration sleeves, penetration bellows, and dissimilar metal welds	Cumulative fatigue damage (CLB fatigue analysis exists)	TLAA evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Not applicable, because the maximum operating temperature of these components is insufficient to allow the magnitude of thermal cycles necessary for fatigue. See Section 3.5.3 for further discussion on Time-Limited Aging Analyses.
3.5.1.B-02	Penetration sleeves, penetration bellows, and dissimilar metal welds	Cracking for cyclic loading; crack initiation and growth from SCC	Containment Inservice Inspection (ISI) and containment leak rate test	Yes, detection of aging effects should be further evaluated	The specified aging effect/mechanism is not applicable for these components at NMP2 based on the following: • The maximum operating temperature of these components is insufficient to allow the magnitude of thermal cycles necessary for cracking due to cyclic loading (fatigue). • SCC requires a moist environment. Stainless steel penetrations in the drywell are not exposed to significant moisture. Stainless steel penetrations in the suppression pool may be wetted but are at a lower temperature (< 110^{o}F). • SCC is not an aging effect for stainless steel in treated or demineralized water < 140^{o}F.

Table 3.5.1.B NMP2 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
Common Components of All Types of PWR and BWR Containment					
3.5.1.B-03	Penetration sleeves, penetration bellows, and dissimilar metal welds	Loss of material due to corrosion	Containment ISI and Containment leak rate test	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.23).
3.5.1.B-04	Personnel airlock and equipment hatch	Loss of material due to corrosion	Containment ISI and Containment leak rate test	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.23).
3.5.1.B-05	Personnel airlock and equipment hatch	Loss of leak tightness in closed position due to mechanical wear of locks, hinges and closure mechanisms	Containment leak rate test and plant technical specifications	No	Consistent with NUREG-1801
3.5.1.B-06	Seals, gaskets, and moisture barriers	Loss of sealant and leakage through containment due to deterioration of joint seals, gaskets, and moisture barriers	Containment ISI and containment leak rate test	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.23).

Table 3.5.1.B NMP2 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
PWR Concrete (Reinforced and Prestressed) and Steel Containments **BWR Concrete (Mark II and III) Containment and Steel (Mark I, II and III) Containment** (Note: NMP2 has a Mark II Containment)					
3.5.1.B-07	Concrete elements: foundation, dome, and wall	Aging of accessible and inaccessible concrete areas due to leaching of calcium hydroxide, aggressive chemical attack, and corrosion of embedded steel	Containment ISI	Yes, if aging mechanism is significant for inaccessible areas	Not applicable to NMPNS, because a below grade aggressive environment does not exist. Nonetheless, NMP2 credits the ASME Section XI Inservice Inspection (Subsection IWL) Program (Appendix B2.1.24) for these components. Inaccessible areas are compared against accessible areas and where warranted, additional inspections are performed.
3.5.1.B-08	Concrete elements: foundation	Cracks, distortion, and increases in component stress level due to settlement	Structures monitoring	No, if within the scope of the applicant's structures monitoring program	Not applicable, because the structures at NMPNS are founded on impervious rock. Nonetheless, NMP2 credits the Structures Monitoring Program (Appendix B2.1.28) for these components.

Table 3.5.1.B NMP2 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
PWR Concrete (Reinforced and Prestressed) and Steel Containments **BWR Concrete (Mark II and III) Containment and Steel (Mark I, II and III) Containment** (Note: NMP2 has a Mark II Containment)					
3.5.1.B-09	Concrete elements: foundation	Reduction in foundation strength due to erosion of porous concrete subfoundation	Structures monitoring	No, if within the scope of the applicant's structures monitoring program	Not applicable, because NMP2 was designed and analyzed to ACI 318-71 and ACI 318-77, *Building Code Requirements for Reinforced Concrete.* Nonetheless, NMP2 credits the Structures Monitoring Program (Appendix B2.1.28) for these components.
3.5.1.B-10	Concrete elements: foundation, dome, and wall	Reduction of strength and modulus due to elevated temperature	Plant-specific	Yes, for any portions of concrete containment that exceed specified temperature limits	Not applicable, because the operating temperatures to which the NMP2 structures are exposed are not sufficient to result in the aging effect/mechanism for these components.
3.5.1.B-11	Prestressed containment: tendons and anchorage components	Loss of prestress due to relaxation, shrinkage, creep, and elevated temperature	TLAA evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Not applicable, because these components do not exist at NMP2.
3.5.1.B-12	Steel elements: liner plate and containment shell	Loss of material due to corrosion in accessible and inaccessible areas	Containment ISI and containment leak rate test	Yes, if corrosion is significant for inaccessible areas	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.23). Inaccessible areas are compared against accessible areas and where warranted, additional inspections are performed.

Table 3.5.1.B NMP2 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
PWR Concrete (Reinforced and Prestressed) and Steel Containments **BWR Concrete (Mark II and III) Containment and Steel (Mark I, II and III) Containment** (Note: NMP2 has a Mark II Containment)					
3.5.1.B-13	Steel elements: vent header, drywell head, torus, downcomers, and pool shell	Cumulative Fatigue damage (CLB fatigue analysis exists)	TLAA evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Not applicable, because the maximum operating temperature of these components is insufficient to allow the magnitude of thermal cycles necessary for fatigue. See Section 3.5.3 for further discussion on Time-Limited Aging Analyses.
3.5.1.B-14	Steel elements: protected by coating	Loss of material due to corrosion in accessible areas only	Protective coating monitoring and maintenance	No	Not applicable, because coatings are not credited to manage aging at NMP2.
3.5.1.B-15	Prestressed containment: tendons and anchorage components	Loss of material due to corrosion of prestressing tendons and anchorage components	Containment ISI	No	Not applicable, because these components do not exist at NMP2.

Table 3.5.1.B NMP2 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
PWR Concrete (Reinforced and Prestressed) and Steel Containments **BWR Concrete (Mark II and III) Containment and Steel (Mark I, II and III) Containment** (Note: NMP2 has a Mark II Containment)					
3.5.1.B-16	Concrete elements: foundation, dome, and wall	Scaling, cracking, and spalling due to freeze-thaw; expansion and cracking due to reaction with aggregate	Containment ISI	No	Not applicable, because: • NMP2 was designed and analyzed to ACI 318-71 and ACI 318-77, *Building Code Requirements for Reinforced Concrete.* • NMP2 Primary Containment does not have an independent foundation. The Reactor Building base mat provides the foundation for the Primary Containment and is inspected via the Structures Monitoring Program (Appendix B2.1.28).

Table 3.5.1.B NMP2 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
PWR Concrete (Reinforced and Prestressed) and Steel Containments **BWR Concrete (Mark II and III) Containment and Steel (Mark I, II and III) Containment** (Note: NMP2 has a Mark II Containment)					
3.5.1.B-17	Steel elements: vent line bellows, vent headers, and downcomers	Cracking due to cyclic loads; crack initiation and growth due to SCC	Containment ISI and Containment leak rate test	Yes, detection of aging effects is to be evaluated	The specified aging effect/mechanism is not applicable for these components at NMP2 based on the following: • The maximum operating temperature of these components is insufficient to allow the magnitude of thermal cycles necessary for cracking due to cyclic loading (fatigue). • SCC is not considered an aging effect for wrought austenitic stainless steel at temperatures < 140°F. Portions of the downcomers that are wetted are < 140°F. Other parts of the downcomers are not wetted so are not susceptible to SCC. • NMP2 does not have vent lines or vent headers.

Table 3.5.1.B NMP2 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
PWR Concrete (Reinforced and Prestressed) and Steel Containments **BWR Concrete (Mark II and III) Containment and Steel (Mark I, II and III) Containment** (Note: NMP2 has a Mark II Containment)					
3.5.1.B-18	Steel elements: suppression chamber liner	Crack initiation and growth due to SCC	Containment ISI and containment leak rate test	No	The specified aging effect/mechanism is not applicable for these components at NMP2 based on the following: • SCC is not considered an aging effect for wrought austenitic stainless steel at temperatures < 140°F. The NMP2 suppression pool temperature is < 140°F. • Areas of the liner not in the pool are not wetted; therefore, they are not susceptible to SCC.

Table 3.5.1.B NMP2 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
PWR Concrete (Reinforced and Prestressed) and Steel Containments **BWR Concrete (Mark II and III) Containment and Steel (Mark I, II and III) Containment** (Note: NMP2 has a Mark II Containment)					
3.5.1.B-19	Steel elements: drywell head and downcomer pipes	Fretting and lock up due to wear	Containment ISI	No	Not applicable for these components, since the environment causing the aging effect/mechanism is not applicable to NMP2, based on the following: • The Drywell head does not experience relative motion that would cause wear or fretting. • Wear of bolting components during boltup or bolt removal is prevented by proper maintenance practices, thus it is not considered an aging issue. • Downcomer pipes are not subject to relative motion that would cause wear or fretting.

Table 3.5.1.B NMP2 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
Class I Structures					
3.5.1.B-20	All Groups except Group 6: accessible interior/ exterior concrete and steel components	All types of aging effects	Structures monitoring	No, if within the scope of the applicant's structures monitoring program	Consistent with NUREG-1801 except that the Reactor Head Cavity Plug Liners and Main Stack steel components are not identified in NUREG-1801. Not applicable for concrete components. There is no aging effect requiring management for concrete components because NMP2 was designed and constructed to recognized codes and standards for reinforced concrete structures. Nonetheless, NMP2 credits the Structures Monitoring Program (Appendix B2.1.28) to monitor the condition of the structures.
3.5.1.B-21	Groups 1-3, 5, 7-9: inaccessible concrete components, such as exterior walls below grade and foundation	Aging of inaccessible concrete areas due to aggressive chemical attack, and corrosion of embedded steel	Plant specific	Yes, if an aggressive below-grade environment exists	Not applicable because ground water test data confirms that a below grade aggressive environment does not exist. Additionally, there is no aging effect requiring management for concrete components above grade because NMP2 was designed and constructed to recognized codes and standards for reinforced concrete structures. Nonetheless, NMP2 credits the Structures Monitoring Program (Appendix B2.1.28) for these components.

Table 3.5.1.B NMP2 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
Class I Structures					
3.5.1.B-22	Group 6: all accessible/ Inaccessible concrete, steel, and earthen components	All types of aging effects, including loss of material due to abrasion, cavitation, and corrosion	Inspection of water-control structures or FERC/US Army Corp of Engineers dam inspection and maintenance	No	Consistent with NUREG-1801 for earthen water control components only, except that NMP2 credits the Structures Monitoring Program (Appendix B2.1.28) for these components. There are no concrete or steel water control components at NMP2.
3.5.1.B-23	Group 5: liners	Crack initiation and growth due to SCC; loss of material due to crevice corrosion	Water chemistry and monitoring of spent fuel pool water level	No	Not applicable, because the NMP2 spent fuel pool has an environment of low temperature treated water in which stainless steel is not susceptible to SCC and crevice corrosion.
3.5.1.B-24	Groups 1-3, 5, 6: all masonry block walls	Cracking due to restraint, shrinkage, creep, and aggressive environment	Masonry wall	No	Consistent with NUREG-1801.
3.5.1.B-25	Groups 1-3, 5, 7-9: foundation	Cracks, distortion, and increases in component stress level due to settlement	Structures monitoring	No, if within the scope of the applicant's structures monitoring program	Not applicable, because settlement is not an aging effect requiring management. The structures at NMPNS are founded on impervious rock. Nonetheless, NMP2 credits the Structures Monitoring Program (Appendix B2.1.28) for these components.
3.5.1.B-26	Groups 1-3, 5-9: foundation	Reduction in foundation strength due to erosion of porous concrete subfoundation	Structures monitoring	No, if within the scope of the applicant's structures monitoring program	Not applicable, because NMP2 was designed and analyzed to ACI 318-71 and ACI 318-77, *Building Code Requirements for Reinforced Concrete.* Nonetheless, NMP2 credits the Structures Monitoring Program (Appendix B2.1.28) for these components.

Table 3.5.1.B NMP2 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
Class I Structures					
3.5.1.B-27	Groups 1-5: Concrete	Reduction of strength and modulus due to elevated temperature	Plant specific	Yes, for any portions of concrete that exceed specified temperature limits	Not applicable, because the operating temperatures to which the NMP2 structures are exposed are not sufficient to result in the aging effect/mechanism for these components.
3.5.1.B-28	Groups 7, 8: liners	Crack Initiation and growth due to SCC; loss of material due to crevice corrosion	Plant specific	Yes	Not applicable, because the plant-specific IPA identified no tank liners that are subject to aging management review.
Component Supports					
3.5.1.B-29	All Groups: support members: anchor bolts, concrete surrounding anchor bolts, welds, grout pad, bolted connections, etc.	Aging of component supports	Structures monitoring	No, if within the scope of the applicant's structures monitoring program	Consistent with NUREG-1801.
3.5.1.B-30	Groups B1.1, B1.2, and B1.3: support members: anchor bolts and welds	Cumulative fatigue damage (CLB fatigue analysis exists)	TLAA evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Not applicable, because the maximum operating temperature of these components is insufficient to allow the magnitude of thermal cycles necessary for fatigue. See Section 3.5.3 for further discussion on TLAAs.
3.5.1.B-31	PWR only				

Table 3.5.1.B NMP2 Summary of Aging Management Programs for Structures and Component Supports Evaluated in Chapter II and III of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
Component Supports					
3.5.1.B-32	Groups B1.1, B1.2, and B1.3: support members: anchor bolts, welds, spring hangers, guides, stops, and vibration isolators	Loss of material due to environmental corrosion; loss of mechanical function due to corrosion, distortion, dirt, overload, etc.	ISI	No	Consistent with NUREG-1801 with exceptions (see Appendix B2.1.25).
3.5.1.B-33	Group B1.1: high strength low-alloy bolts	Crack initiation and growth due to SCC	Bolting integrity	No	Not applicable, because structural high-strength bolts are not exposed to enough moisture to cause SCC.

Table 3.5.2.A-1 Structures and Component Supports
NMP1 Primary Containment Structure – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Airlocks	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.2-a	3.5.1.A-04	B
				Loss of Leak Tightness	10 CFR 50 Appendix J Program	II.B4.2-b	3.5.1.A-05	A, 3
Concrete in Air	SFS SNSR	Concrete	Air	None	Structures Monitoring Program			H, 6
Equipment Hatches (including stabilizers)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.2-a	3.5.1.A-04	B
Expansion Joints (Mechanical)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B1.1.1-a	3.5.1.A-12	D, 4
		Wrought Austenitic Stainless Steel	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-1 Structures and Component Supports
NMP1 Primary Containment Structure – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A4.2-a	3.5.1.A-20	A
				Loss of Anchor Capacity	Structures Monitoring Program			H
Fasteners (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A4.2-a	3.5.1.A-20	A
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	SFS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Structures Monitoring Program	III.A4.2-a	3.5.1.A-20	A
Fasteners (High Strength Carbon and Low Alloy Steel) in Demineralized Untreated Water, Low Flow	SFS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Demineralized Untreated Water, Low Flow	Cracking	One-Time Inspection Program			H
				Loss of Material	ASME Section XI Inservice Inspection (Subsection IWE) Program	III.A4.2-a	3.5.1.A-20	E

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-1 Structures and Component Supports
NMP1 Primary Containment Structure – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Piping (Mechanical)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B1.1.1-a	3.5.1.A-12	D, 4
					10 CFR 50 Appendix J Program One-Time Inspection Program			Q, 5
Polymer in Air	PB SP	Polymers	Air	Cracking	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.3-a	3.5.1.A-06	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-1 Structures and Component Supports
NMP1 Primary Containment Structure – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Polymer in Air (cont'd)	PB SP	Polymers	Air	Hardening and Shrinkage	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.3-a	3.5.1.A-06	B
				Loss of Strength	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.3-a	3.5.1.A-06	B
Structural Steel (Carbon and Low Alloy Steel) in Air	MB PB SP SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A4.2-a	3.5.1.A-20	A
					10 CFR 50 Appendix J Program	II.B1.1.1-a	3.5.1.A-12	B
					ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.1-a	3.5.1.A-03	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-1 Structures and Component Supports
NMP1 Primary Containment Structure – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Structural Steel (Carbon and Low Alloy Steel) in Demineralized Untreated Water, Low Flow	FPB PB SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Demineralized Untreated Water, Low Flow	Loss of Material	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B1.1.1-a	3.5.1.A-12	B
						II.B4.1-a	3.5.1.A-03	B
					Torus Corrosion Monitoring Program Water Chemistry Control Program	II.B1.1.1-a	3.5.1.A-12	E
					Water Chemistry Control Program	II.B4.1-a	3.5.1.A-03	E
Structural Steel (Wrought Austenitic Stainless Steel) in Air	PB SFS	Wrought Austenitic Stainless Steel	Air	None	None			None
Structural Steel (Wrought Austenitic Stainless Steel) in Demineralized Untreated Water, Low Flow	SFS	Wrought Austenitic Stainless Steel	Demineralized Untreated Water, Low Flow	Loss of Material	ASME Section XI Inservice Inspection (Subsection IWE) Program			Q

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-1 Structures and Component Supports
NMP1 Primary Containment Structure – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Valves (Mechanical)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B1.1.1-a	3.5.1.A-12	D, 4
					One-Time Inspection Program			Q, 5
		Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
		Wrought Austenitic Stainless Steel	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-2 Structures and Component Supports
NMP1 Reactor Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Aluminum Alloys in Air	FP	Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
Aluminum Alloys in Treated Water	FP SNSR	Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Treated Water, temperature < 140°F, Low Flow	None	None			None
Block Wall in Air	FB PB	Masonry Walls	Air	Cracking	Masonry Wall Program	III.A2.3-a	3.5.1.A-24	A
Boraflex in Treated Water	AN	Boraflex	Treated Water, temperature < 140°F, Gamma Irradiation	Change in Dimensions	Boraflex Monitoring Program			H
				Loss of Neutron Absorbing Capacity	Boraflex Monitoring Program	VII.A2.1-a	3.3.1.A-12	B
Boral in Treated Water	AN	Boral	Treated Water, temperature < 140°F, Gamma Irradiation	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-2 Structures and Component Supports
NMP1 Reactor Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Concrete in Air	FB SP SNSR SFS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	SP SNSR SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	SP SNSR SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.A-20	C, 1
	FB PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.A-20	C, 1

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-2 Structures and Component Supports
NMP1 Reactor Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Doors (cont'd)	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.A-20	A
	PB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.A-20	A
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.A-20	A
				Loss of Anchor Capacity	Structures Monitoring Program			H
Fasteners (Carbon and Low Alloy Steel) in Air	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.A-20	A
Fasteners (Wrought Austenitic Stainless Steel) in Air	SFS	Wrought Austenitic Stainless Steel	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-2 Structures and Component Supports
NMP1 Reactor Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Fasteners (Wrought Austenitic Stainless Steel) in Treated Water	SFS	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
Metal Siding in Air	PB	Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-2 Structures and Component Supports
NMP1 Reactor Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Polymer in Air	PB SP	Polymers	Air	Cracking	Structures Monitoring Program			J
				Hardening and Shrinkage	Structures Monitoring Program			J
				Loss of Strength	Structures Monitoring Program			J
Polymer in Treated Water	PB	Polymers	Treated Water, temperature < 140°F, Low Flow	Cracking	Structures Monitoring Program			J
				Loss of Strength	Structures Monitoring Program			J
Rock Anchors (Carbon and Low Alloy Steel) in Soil Below the GWT	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Soil, below the water table	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.A-20	A
Structural Steel (Carbon and Low Alloy Steel) in Air	FB FPB MB PB SP SFS TS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.A-20	A
Structural Steel (Wrought Austenitic Stainless Steel) in Treated Water	PB	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-2 Structures and Component Supports
NMP1 Reactor Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Torus Support Columns	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	ASME Section XI Inservice Inspection (Subsection IWF) Program	III.B1.3.1-a	3.5.1.A-32	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-3 Structures and Component Supports
NMP1 Essential Yard Structures – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Concrete in Air	FB SFS SNSR	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	SFS SNSR	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	SNSR	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Fasteners (Carbon and Low Alloy Steel) in Air	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A
Polymer in Air, Relative Motion (Bearing Plate)	SNSR	Polymers	Air, relative motion between components	Cracking	Structures Monitoring Program			J
				Hardening and Shrinkage	Structures Monitoring Program			J
				Loss of Material	Structures Monitoring Program			J
				Loss of Strength	Structures Monitoring Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-3 Structures and Component Supports
NMP1 Essential Yard Structures – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Structural Steel (Carbon and Low Alloy Steel) in Air	SP SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-4 Structures and Component Supports
NMP1 Fuel Handling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Fasteners (Wrought Austenitic Stainless Steel) in Treated Water	SFS	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
Spent Fuel Racks	SFS	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
Structural Steel (Wrought Austenitic Stainless Steel) in Treated Water	SFS SNSR	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-5 Structures and Component Supports
NMP1 Material Handling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Crane (Reactor Building)	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Inspection of Overhead Heavy Load and Light Load Handling Systems Program	VII.B.1-b	3.3.1.A-16	A
Hoists	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Inspection of Overhead Heavy Load and Light Load Handling Systems Program	VII.B.1-b	3.3.1.A-16	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-6 Structures and Component Supports
NMP1 Offgas Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Block Wall in Air	FB	Masonry Walls	Air	Cracking	Masonry Wall Program	III.A3.3-a	3.5.1.A-24	A
Concrete in Air	FB SFS SNSR	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Below the GWT	SNSR	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.A-20	C, 1
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A
				Loss of Anchor Capacity	Structures Monitoring Program			H

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-6 Structures and Component Supports
NMP1 Offgas Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Fasteners (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A
Fasteners (Wrought Austenitic Stainless Steel) in Air	SNSR	Wrought Austenitic Stainless Steel	Air	None	None			None
Structural Steel (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-7 Structures and Component Supports
NMP1 Radwaste Solidification and Storage Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Block Wall in Air	FB TS	Masonry Walls	Air	Cracking	Masonry Wall Program	III.A3.3-a	3.5.1.A-24	A
Concrete in Air	DF FB FP SNSR TS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	FP SNSR	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	FP SNSR	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.A-20	C, 1
Fasteners (Carbon and Low Alloy Steel) in Air	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	SNSR	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-7 Structures and Component Supports
NMP1 Radwaste Solidification and Storage Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Polymer in Air	GDP	Polymers	Air	Cracking	Structures Monitoring Program			J
				Hardening and Shrinkage	Structures Monitoring Program			J
				Loss of Strength	Structures Monitoring Program			J
Structural Steel (Carbon and Low Alloy Steel) in Air	FP PB SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-8 Structures and Component Supports
NMP1 Screen and Pump House Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Block Wall in Air	FB	Masonry Walls	Air	Cracking	Masonry Wall Program	III.A3.3-a	3.5.1.A-24	A
Concrete in Air	FB SP SFS SNSR	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Raw Water	SP SFS SNSR	Concrete	Raw Water	None	Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	SP SFS SNSR	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	SP SFS SNSR	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.1-d	3.3.1.A-20	A
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A
				Loss of Anchor Capacity	Structures Monitoring Program			H

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-8 Structures and Component Supports
NMP1 Screen and Pump House Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Fasteners (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A
Fasteners (Carbon and Low Alloy Steel) in Raw Water	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A
Structural Steel (Carbon and Low Alloy Steel) in Air	FB SP SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A
Structural Steel (Carbon and Low Alloy Steel) in Raw Water	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-8 Structures and Component Supports
NMP1 Screen and Pump House Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Structural Steel (Carbon and Low Alloy Steel) in Soil Above the GWT	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Soil, above the water table	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A
Structural Steel (Carbon and Low Alloy Steel) in Soil Below the GWT	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Soil, below the water table	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-9 Structures and Component Supports
NMP1 Turbine Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Block Wall in Air	FB RS	Masonry Walls	Air	Cracking	Masonry Wall Program	III.A3.3-a	3.5.1.A-24	A
Concrete in Air	FB RS SP SFS SNSR	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	SP SFS SNSR	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	SP SFS SNSR	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.2-d	3.3.1.A-20	A
	FB SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.2-d	3.3.1.A-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-9 Structures and Component Supports
NMP1 Turbine Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Doors (cont'd)	SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A
	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A
				Loss of Anchor Capacity	Structures Monitoring Program			H
Fasteners (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-9 Structures and Component Supports
NMP1 Turbine Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Structural Steel (Carbon and Low Alloy Steel) in Air	SP SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-10 Structures and Component Supports
NMP1 Vent Stack – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Concrete in Air	FB GDP SFS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	GDP SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Structural Steel (Carbon and Low Alloy Steel) in Air	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	C, 2

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-11 Structures and Component Supports
NMP1 Waste Disposal Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Block Wall in Air	FB	Masonry Walls	Air	Cracking	Masonry Wall Program	III.A3.3-a	3.5.1.A-20	A
Concrete in Air	DF FB FP SP SFS SNSR	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	FP SP SFS SNSR	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	FP SP SFS SNSR	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.A-20	C, 1

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-11 Structures and Component Supports
NMP1 Waste Disposal Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A
				Loss of Anchor Capacity	Structures Monitoring Program			H
Fasteners (Carbon and Low Alloy Steel) in Air	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A
Fasteners (Wrought Austenitic Stainless Steel) in Air	SNSR	Wrought Austenitic Stainless Steel	Air	None	None			None
Polymer in Air	FP	Polymers	Air	Cracking	Structures Monitoring Program			J
				Hardening and Shrinkage	Structures Monitoring Program			J
				Loss of Strength	Structures Monitoring Program			J
Structural Steel (Carbon and Low Alloy Steel) in Air	FB FP SP SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.A-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.A-11 Structures and Component Supports
NMP1 Waste Disposal Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Structural Steel (Wrought Austenitic Stainless Steel) in Air	SNSR	Wrought Austenitic Stainless Steel	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-1 Structures and Component Supports
NMP2 Primary Containment Structure – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Air Locks	FPB MB PB RS SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.2-a	3.5.1.B-04	B
Aluminum Alloy in Air	PWR	Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
Biological Shield Wall Doors	HELB RS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A
Concrete in Air	HELB MB PB RS SP SFS	Concrete	Air	None	ASME Section XI Inservice Inspection (Subsection IWL) Program Structures Monitoring Program			H, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-1 Structures and Component Supports
NMP2 Primary Containment Structure – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Drywell Head (including stainless steel elements)	FPB MB PB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B2.2.2-a	3.5.1.B-12	B
		Wrought Austenitic Stainless Steel	Air	None	None			None
Drywell Head Closure Pins	FPB PB SFS	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
Drywell Head Fasteners	SNSR	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	PWR SFS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Structures Monitoring Program	III.A4.2-a	3.5.1.B-20	A
					ASME Section XI Inservice Inspection (Subsection IWE) Program			Q

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-1 Structures and Component Supports
NMP2 Primary Containment Structure – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Fasteners (Precipitation Hardenable)	PWR	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
Hatches	FPB MB PB RS SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.2-a	3.5.1.B-04	B
Hatches (cont'd)	FPB MB PB RS SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.2-a	3.5.1.B-04	B
		Wrought Austenitic Stainless Steel	Air	None	None			None
Impingement and Jet Shielding	DF HELB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A4.2-a	3.5.1.B-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-1 Structures and Component Supports
NMP2 Primary Containment Structure – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Inner Refueling Seal	SNSR	Wrought Austenitic Stainless Steel	Air	None	None			None
Polymer in Air	DF PB	Polymers	Air	Cracking	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.3-a	3.5.1.B-06	B
				Hardening and Shrinkage	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.3-a	3.5.1.B-06	B
				Loss of Strength	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.3-a	3.5.1.B-06	B

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-1 Structures and Component Supports
NMP2 Primary Containment Structure – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Refueling Bulkhead	PB SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Air	None	None			None
Star Truss	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A4.2-a	3.5.1.B-20	A
Structural Steel (Carbon and Low Alloy Steel) in Air	HELB MB PWR PB RS SP SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B2.2.2-a II.B4.1-a	3.5.1.B-12 3.5.1.B-03	B B
					Structures Monitoring Program	III.A4.2-a	3.5.1.B-20	A
Structural Steel (Carbon/Low Alloy Clad with Stainless Steel) in Air	HELB MB PB SP SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-1 Structures and Component Supports
NMP2 Primary Containment Structure – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Structural Steel (Carbon/Low Alloy Clad with Stainless Steel) in Demineralized Untreated Water	HELB MB PB SP SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) (Clad with Stainless Steel)	Demineralized Untreated Water, Low Flow	Loss of Material	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program	II.B4.1-a	3.5.1.B-03	B
Structural Steel (Wrought Austenitic Stainless Steel) in Air	DF HELB MB PWR PB SP SFS	Wrought Austenitic Stainless Steel	Air	None	None			None
Structural Steel (Wrought Austenitic Stainless Steel) in Demineralized Untreated Water	DF HELB MB PB SP SFS	Wrought Austenitic Stainless Steel	Demineralized Untreated Water, Low Flow	Loss of Material	10 CFR 50 Appendix J Program ASME Section XI Inservice Inspection (Subsection IWE) Program			H

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-2 Structures and Component Supports
NMP2 Reactor Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Aluminum Alloy in Air	SP	Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
Boraflex in Treated Water	AN	Boraflex	Treated Water, temperature < 140°F, Gamma Irradiation	Change in Dimensions	Boraflex Monitoring Program			H
				Loss of Neutron Absorbing Capacity	Boraflex Monitoring Program	VII.A2.1-a	3.3.1.B-12	B
Boral in Treated Water	AN	Boral	Treated Water, temperature < 140°F, Gamma Irradiation	None	None			None
Concrete in Air (includes removable floor/wall)	DF FB FP HELB MB PB RS SP SFS SNSR	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-2 Structures and Component Supports
NMP2 Reactor Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Concrete in Soil Above the GWT	FP PB SP SFS SNSR	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	FP PB SP SFS SNSR	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Below the GWT	SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-2 Structures and Component Supports
NMP2 Reactor Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	C, 1
	FB FP SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	C, 1
	FB PB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	C, 1
	FB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	C, 1

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-2 Structures and Component Supports
NMP2 Reactor Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Doors (cont'd)	FP SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A
	PB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A
	RS SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A
	RS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-2 Structures and Component Supports
NMP2 Reactor Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Doors (cont'd)	SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A
	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A
				Loss of Anchor Capacity	Structures Monitoring Program			H
Fasteners (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	SFS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-2 Structures and Component Supports
NMP2 Reactor Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Fasteners (Precipitation Hardenable) in Air	PWR SP SFS	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
Fasteners (Wrought Austenitic Stainless Steel) in Air	SFS	Wrought Austenitic Stainless Steel	Air	None	None			None
Fasteners (Wrought Austenitic Stainless Steel) in Soil Below the GWT	FP	Wrought Austenitic Stainless Steel	Soil, below the water table	Loss of Material	Structures Monitoring Program			J
Fasteners (Wrought Austenitic Stainless Steel) in Treated Water	SFS	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None
Fuel Pool Gates	SFS	Wrought Austenitic Stainless Steel	Air	None	None			None
Fuel Transfer Shielding Bridge (Refueling Area)	SNSR	Wrought Austenitic Stainless Steel	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-2 Structures and Component Supports
NMP2 Reactor Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Liners	PB	Wrought Austenitic Stainless Steel	Air	None	None			None
			Treated Water, temperature < 140°F, Low Flow	None	None			None
Mechanical Penetrations (thimbles)	FP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Soil, below the water table	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A
Metal Siding in Air	SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A
Plug Liners	PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	C, 7

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-2 Structures and Component Supports
NMP2 Reactor Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Polymer in Air	PB SP SNSR	Polymers	Air	Cracking	Structures Monitoring Program			J
				Hardening and Shrinkage	Structures Monitoring Program			J
				Loss of Strength	Structures Monitoring Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-2 Structures and Component Supports
NMP2 Reactor Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Polymer in Soil Below the GWT	FP	Polymers	Soil, below the water table	Cracking	Structures Monitoring Program			J
				Loss of Strength	Structures Monitoring Program			J
Porous Concrete in Soil Below the GWT	SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Structural Steel (Carbon and Low Alloy Steel) in Air	PWR PB SP SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A2.2-a	3.5.1.B-20	A
Structural Steel (Wrought Austenitic Stainless Steel) in Air	SP SFS SNSR	Wrought Austenitic Stainless Steel	Air	None	None			None
Overpressurization Vent Panels	SFS	Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-3 Structures and Component Supports
NMP2 Auxiliary Service Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Concrete in Air (includes removable floor/wall)	FB FP MB SP SFS SNSR	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	FP SP SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	FP SP SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	A
Fasteners (Carbon and Low Alloy Steel) in Air	SP SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-3 Structures and Component Supports
NMP2 Auxiliary Service Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Structural Steel (Carbon and Low Alloy Steel) in Air	SP SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-4 Structures and Component Supports
NMP2 Control Room Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Concrete in Air (includes removable floor/wall)	FB FP MB PB RS SP SFS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	FP SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	FP SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Below the GWT	SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	C, 1
	FB FP SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	C, 1

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-4 Structures and Component Supports
NMP2 Control Room Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Doors (cont'd)	FB PB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	C, 1
	FB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	C, 1
	MB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A1.2-a	3.5.1.B-20	A
	SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A1.2-a	3.5.1.B-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-4 Structures and Component Supports
NMP2 Control Room Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Doors (cont'd)	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A1.2-a	3.5.1.B-20	A
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A1.2-a	3.5.1.B-20	A
				Loss of Anchor Capacity	Structures Monitoring Program			H
Fasteners (Carbon and Low Alloy Steel) in Air	SP SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A1.2-a	3.5.1.B-20	A
Structural Steel (Carbon and Low Alloy Steel) in Air	SP SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A1.2-a	3.5.1.B-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-5 Structures and Component Supports
NMP2 Diesel Generator Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Concrete in Air	FB FP MB SP SFS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	FP SP SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	FP SP SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Air	SFS	Concrete	Air	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Above GWT	SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Below GWT	SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.4-d	3.3.1.B-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-5 Structures and Component Supports
NMP2 Diesel Generator Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Doors (cont'd)	FB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.4-d	3.3.1.B-20	A
	SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
				Loss of Anchor Capacity	Structures Monitoring Program			H

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

**Table 3.5.2.B-5 Structures and Component Supports
NMP2 Diesel Generator Building – Summary of Aging Management Evaluation**

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Fasteners (Carbon and Low Alloy Steel) in Air	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Polymer in Air	FP	Polymers	Air	Cracking	Structures Monitoring Program			J
				Hardening and Shrinkage	Structures Monitoring Program			J
				Loss of Strength	Structures Monitoring Program			J
Structural Steel (Carbon and Low Alloy Steel) in Air	MB SP SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-6 Structures and Component Supports
NMP2 Essential Yard Structures – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Aluminum Alloy in Air	SNSR	Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
Concrete in Air (includes removable floor/wall)	FB FP MB SNSR SP	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	FP MB SNSR SP SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	FP SNSR SP SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Below GWT	SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-6 Structures and Component Supports
NMP2 Essential Yard Structures – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	C, 1
	FB SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	C, 1
	SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-6 Structures and Component Supports
NMP2 Essential Yard Structures – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Earthen Berm in Air	FP	Earthen structures constructed primarily of soil	Air	Loss of Form	Structures Monitoring Program	III.A6.4-a	3.5.1.B-22	E
				Loss of Material	Structures Monitoring Program	III.A6.4-a	3.5.1.B-22	E
				Loss of Material Properties	Structures Monitoring Program	III.A6.4-a	3.5.1.B-22	E
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	FP SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Anchor Capacity	Structures Monitoring Program			H
				Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Fasteners (Carbon and Low Alloy Steel) in Air	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Fasteners (Wrought Austenitic Stainless Steel) in Air	FP	Wrought Austenitic Stainless Steel	Air	None	None			None
Fasteners (Wrought Austenitic Stainless Steel) in Soil Below the GWT	FP	Wrought Austenitic Stainless Steel	Soil, below the water table	Loss of Material	Structures Monitoring Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-6 Structures and Component Supports
NMP2 Essential Yard Structures – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Gray Cast Iron in Air	SP	Gray Cast Iron	Air	Loss of Material	Structures Monitoring Program			J
Gray Cast Iron in Soil Above the GWT	SP	Gray Cast Iron	Soil, above the water table	Loss of Material	Structures Monitoring Program			J
Mechanical Penetrations (thimbles)	FP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Soil, below the water table	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Polymer in Air	FP	Polymers	Air	Cracking	Structures Monitoring Program			J
				Hardening and Shrinkage	Structures Monitoring Program			J
				Loss of Strength	Structures Monitoring Program			J
Polymer in Soil Below the GWT	FP	Polymers	Soil, below the water table	Cracking	Structures Monitoring Program			J
				Loss of Strength	Structures Monitoring Program			J
Revetment Ditch in Air	FP	Earthen structures constructed primarily of soil	Air	Loss of Form	Structures Monitoring Program	III.A6.4-a	3.5.1.B-22	E
				Loss of Material	Structures Monitoring Program	III.A6.4-a	3.5.1.B-22	E
				Loss of Material Properties	Structures Monitoring Program	III.A6.4-a	3.5.1.B-22	E
Stone-Faced Dike in Air	FP	Stones or large rocks	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-6 Structures and Component Supports
NMP2 Essential Yard Structures – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Structural Steel (Carbon and Low Alloy Steel) in Air	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Treated Wood in Air	SNSR	Wood	Air	Loss of Material	Structures Monitoring Program			J
				Loss of Material Properties	Structures Monitoring Program			J
Treated Wood in Soil Above the GWT	SNSR	Wood	Soil, above the water table	Loss of Material	Structures Monitoring Program			J
				Loss of Material Properties	Structures Monitoring Program			J
Treated Wood in Soil Below the GWT	SNSR	Wood	Soil, below the water table	Loss of Material	Structures Monitoring Program			J
				Loss of Material Properties	Structures Monitoring Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-7 Structures and Component Supports
NMP2 Fuel Handling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Carousel	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program			Q
Lifting Beams	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program			Q
New Fuel Storage Rack	SFS	Wrought Austenitic Stainless Steel	Air	None	None			None
New Fuel Storage Vault Cover	SNSR	Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
Recirculation Pump Motor Lifting Lugs	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program			Q

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-7 Structures and Component Supports
NMP2 Fuel Handling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Refueling Crane and Platform Equipment	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Inspection of Overhead Heavy Load and Light Load Handling Systems Program	VII.B.1-b	3.3.1.B-16	A
Storage Racks and Frames	SFS	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-8 Structures and Component Supports
NMP2 Main Stack – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Concrete in Air	GDP SFS SNSR	Concrete	Air	None	Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Below the GWT	SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	C, 2
				Loss of Anchor Capacity	Structures Monitoring Program			P
Fasteners (Carbon and Low Alloy Steel) in Air	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	C, 2
Structural Steel (Carbon and Low Alloy Steel) in Air	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	C, 2

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-9 Structures and Component Supports
NMP2 Material Handling System – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Handling Cranes	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Inspection of Overhead Heavy Load and Light Load Handling Systems Program	VII.B.1-b	3.3.1.B-16	A
Hoists	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Inspection of Overhead Heavy Load and Light Load Handling Systems Program	VII.B.1-b	3.3.1.B-16	A
Polar Crane	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Inspection of Overhead Heavy Load and Light Load Handling Systems Program	VII.B.1-b	3.3.1.B-16	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-10 Structures and Component Supports
NMP2 Radwaste Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Concrete in Air	FB FP RS SNSR	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	FP SNSR	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	FP SNSR	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Below the GWT	SNSR	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	C, 1
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
				Loss of Anchor Capacity	Structures Monitoring Program			H

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-10 Structures and Component Supports
NMP2 Radwaste Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Fasteners (Carbon and Low Alloy Steel) in Air	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Structural Steel (Carbon and Low Alloy Steel) in Air	FP RS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-11 Structures and Component Supports
NMP2 Screenwell Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Block Wall in Air	FB	Masonry Walls	Air	Cracking	Masonry Wall Program	III.A3.3-a	3.5.1.B-24	A
Concrete in Air (includes removable floor/wall)	FB FP MB SP SFS SNSR	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Raw Water	FP MB SP SFS SNSR	Concrete	Raw Water	None	Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	FP SP SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	FP SP SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Raw Water	SFS	Concrete	Raw Water	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Above the GWT	SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Below the GWT	SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-11 Structures and Component Supports
NMP2 Screenwell Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.1-d	3.3.1.B-20	A
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
				Loss of Anchor Capacity	Structures Monitoring Program			H
Fasteners (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Fasteners (Carbon and Low Alloy Steel) in Raw Water	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Fasteners (Wrought Austenitic Stainless Steel) in Raw Water	SFS	Wrought Austenitic Stainless Steel	Raw Water	Cracking	Structures Monitoring Program			J
				Loss of Material	Structures Monitoring Program			J

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-11 Structures and Component Supports
NMP2 Screenwell Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Polymer in Raw Water	SFS	Polymers	Raw Water	Cracking	Structures Monitoring Program			J
				Loss of Strength	Structures Monitoring Program			J
Structural Steel (Carbon and Low Alloy Steel) in Air	SP SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Structural Steel (Carbon and Low Alloy Steel) in Raw Water	CWS FLT SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Raw Water	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Structural Steel (Wrought Austenitic Stainless Steel) in Raw Water	SP SFS	Wrought Austenitic Stainless Steel	Raw Water	Cracking	Structures Monitoring Program			M
				Loss of Material	Structures Monitoring Program			F
Structural Steel Foundation Piles (Carbon and Low Alloy Steel) in Undisturbed Soil	SFS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Undisturbed Soil	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-12 Structures and Component Supports
NMP2 Standby Gas Treatment Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Concrete in Air	FB FP HELB MB SP SFS	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	FP SP SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	FP SP SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Above the GWT	SFS	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Below the GWT	SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	C, 1

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-12 Structures and Component Supports
NMP2 Standby Gas Treatment Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Doors (cont'd)	FB HELB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	C, 1
	FB PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.3-d	3.3.1.B-20	C, 1
	MB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
	MB PB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-12 Structures and Component Supports
NMP2 Standby Gas Treatment Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Doors (cont'd)	SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Fasteners (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	SFS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Structural Steel (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-13 Structures and Component Supports
NMP2 Turbine Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Block Wall in Air	FB	Masonry Walls	Air	Cracking	Masonry Wall Program	III.A3.3-a	3.5.1.B-24	A
Concrete in Air	FB RS SP SFS SNSR	Concrete	Air	None	Fire Protection Program Structures Monitoring Program			H, 6
Concrete in Soil Above the GWT	SP SFS SNSR	Concrete	Soil, above the water table	None	Structures Monitoring Program			H, 6
Concrete in Soil Below the GWT	SP SFS SNSR	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Concrete Lean Fill in Soil Below the GWT	SFS	Concrete	Soil, below the water table	None	Structures Monitoring Program			H, 6
Doors	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.2-d	3.3.1.B-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-13 Structures and Component Supports
NMP2 Turbine Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Doors (cont'd)	FB FP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.2-d	3.3.1.B-20	A
	FB RS	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Fire Protection Program	VII.G.2-d	3.3.1.B-20	A
	FP SP	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air, relative motion between components	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
				Loss of Anchor Capacity	Structures Monitoring Program			H

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.B-13 Structures and Component Supports
NMP2 Turbine Building – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Fasteners (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	PWR SFS	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A
Fasteners (Wrought Austenitic Stainless Steel) in Air	PWR	Wrought Austenitic Stainless Steel	Air	None	None			None
Structural Steel (Carbon and Low Alloy Steel) in Air	RS SP SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Structures Monitoring Program	III.A3.2-a	3.5.1.B-20	A

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

**Table 3.5.2.C-1 Structures and Component Supports[2]
Component Supports – Summary of Aging Management Evaluation**

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Copper Alloy (Zinc < 15%) in Air, Relative Motion (NMP1 only)	SFS SNSR	Copper Alloys (Zinc < 15%)	Air, relative motion between components	Loss of Material	ASME Section XI Inservice Inspection (Subsection IWF) Program			H
Copper Alloy (Zinc ≥ 15%) in Air, Relative Motion (NMP2 only)	SFS SNSR	Copper Alloys (Zinc ≥ 15%) and Aluminum Bronze	Air, relative motion between components	Loss of Material	ASME Section XI Inservice Inspection (Subsection IWF) Program			H
Epoxy Grout in Air (NMP2 only)	SFS	Epoxy Grout	Air	Cracking	Structures Monitoring Program	III.B4.3-a	3.5.1.B-29	A
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	ASME Section XI Inservice Inspection (Subsection IWF) Program	III.B1.1.1-a III.B1.2.1-a III.B1.3.1-a	3.5.1.A-32 3.5.1.B-32	B
					Structures Monitoring Program	III.B2.1-a III.B3.1-a III.B4.1-a III.B5.1-a	3.5.1.A-29 3.5.1.B-29	A

[2] The information in this table applies to NMP1 and NMP2, unless specifically noted.

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.C-1 Structures and Component Supports[2]
Component Supports – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Expansion/ Grouted Anchors (Carbon and Low Alloy Steel) in Air (cont'd)	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Anchor Capacity	ASME Section XI Inservice Inspection (Subsection IWF) Program			H
					Structures Monitoring Program			H
Expansion/ Grouted Anchors (Wrought Austenitic Stainless Steel) in Air (NMP2 only)	SFS	Wrought Austenitic Stainless Steel	Air	Loss of Anchor Capacity	ASME Section XI Inservice Inspection (Subsection IWF) Program			H
					Structures Monitoring Program			H
Fasteners (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	ASME Section XI Inservice Inspection (Subsection IWF) Program	III.B1.1.1-a III.B1.2.1-a III.B1.3.1-a	3.5.1.A-32 3.5.1.B-32	B
					Structures Monitoring Program	III.B2.1-a III.B3.1-a III.B4.1-a III.B5.1-a	3.5.1.A-29 3.5.1.B-29	A

[2] The information in this table applies to NMP1 and NMP2, unless specifically noted.

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.C-1 Structures and Component Supports[2]
Component Supports – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Fasteners (High Strength Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength ≥ 100 Ksi)	Air	Loss of Material	ASME Section XI Inservice Inspection (Subsection IWF) Program	III.B1.1.1-a III.B1.2.1-a III.B1.3.1-a	3.5.1.A-32 3.5.1.B-32	B
					Structures Monitoring Program	III.B4.1-a III.B5.1-a	3.5.1.A-29 3.5.1.B-29	A
Fasteners (Precipitation Hardenable) in Air (NMP1 only)	SFS SNSR	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
Grout in Air	SFS SNSR	Grout	Air	Cracking	Structures Monitoring Program	III.B1.1.4-a III.B1.2.3-a III.B1.3.3-a III.B2.2-a III.B3.2-a III.B4.3-a III.B5.2-a	3.5.1.A-29 3.5.1.B-29	A

[2] The information in this table applies to NMP1 and NMP2, unless specifically noted.

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.C-1 Structures and Component Supports[2]
Component Supports – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Polymeric Supports in Air with Vibratory Motion	SFS SNSR	Polymers	Air with Vibratory Motion	Cracking	Structures Monitoring Program			H
				Hardening and Shrinkage	Structures Monitoring Program			H
				Loss of Material	Structures Monitoring Program			H
				Loss of Strength	Structures Monitoring Program			H
Structural Steel (Carbon and Low Alloy Steel) in Air	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	ASME Section XI Inservice Inspection (Subsection IWF) Program	III.B1.1.1-a III.B1.2.1-a III.B1.3.1-a	3.5.1.A-32 3.5.1.B-32	B
					Structures Monitoring Program	III.B2.1-a III.B3.1-a III.B4.1-a III.B5.1-a	3.5.1.A-29 3.5.1.B-29	A
Structural Steel (Carbon and Low Alloy Steel) in Soil Above the GWT (NMP2 only)	SFS SNSR	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Soil, above the water table	Loss of Material	Structures Monitoring Program	III.B2.1-a III.B3.1-a III.B4.1-a	3.5.1.B-29	A

[2] The information in this table applies to NMP1 and NMP2, unless specifically noted.

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.C-1 Structures and Component Supports[2]
Component Supports – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Structural Steel (Precipitation Hardenable) in Air (NMP2 only)	SFS SNSR	Martensitic, Precipitation Hardenable, and Superferritic Stainless Steels	Air	None	None			None
Structural Steel (Wrought Austenitic Stainless Steel) in Air	SFS SNSR	Wrought Austenitic Stainless Steel	Air	None	None			None
Structural Steel (Wrought Austenitic Stainless Steel) in Air, Relative Motion (NMP2 only)	SFS SNSR	Wrought Austenitic Stainless Steel	Air, relative motion between components	Loss of Material	ASME Section XI Inservice Inspection (Subsection IWF) Program			H
Structural Steel (Wrought Austenitic Stainless Steel) in Treated Water	SFS SNSR	Wrought Austenitic Stainless Steel	Treated Water, temperature < 140°F, Low Flow	None	None			None

[2] The information in this table applies to NMP1 and NMP2, unless specifically noted.

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.C-2 Structures and Component Supports[2]
Fire Stops and Seals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Aluminum Alloy in Air (NMP1 only)	FB	Pure aluminum alloys, and aluminum alloyed with manganese, magnesium, and magnesium plus silicon	Air	None	None			None
Fasteners (Wrought Austenitic Stainless Steel) in Air	FB	Wrought Austenitic Stainless Steel	Air	None	None			None
Fire Stop in Air	FB	Fire Stop	Air	Cracking/ Delamination	Fire Protection Program			H
				Loss of Material	Fire Protection Program			H
				Separation	Fire Protection Program			H
Fire Wrap in Air	FB	Fire Wrap	Air	Cracking/ Delamination	Fire Protection Program			H
				Loss of Material	Fire Protection Program			H

[2] The information in this table applies to NMP1 and NMP2, unless specifically noted.

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.5.2.C-2 Structures and Component Supports[2]
Fire Stops and Seals – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Structural Steel (Carbon and Low Alloy Steel) in Air (NMP2 only)	FB	Carbon or Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron	Air	Loss of Material	Fire Protection Program			Q

[2] The information in this table applies to NMP1 and NMP2, unless specifically noted.

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Notes for Tables 3.5.2.A-1 through 3.5.2.C-2:

A. Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

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

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

D. Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.

E. Consistent with NUREG-1801 for material, environment, and aging effect, but a different aging management program is credited.

F. Material not in NUREG-1801 for this component.

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

H. Aging effect and/or mechanism not in NUREG-1801 for this component, material, and environment combination.

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

J. Neither the component nor the material and environment combination is evaluated in NUREG-1801.

K. Material and environment not in NUREG-1801 for this component and aging effect.

L. Aging effect and environment not in NUREG-1801 for this component and material.

M. Aging effect and material not in NUREG-1801 for this component and environment.

N. Aging effect, material, and environment not in NUREG-1801 for this component.

P. Component and aging effect not in NUREG-1801 for this material and environment.

Q. Component not in NUREG-1801 for this material, environment, and aging effect.

(Note “O” was not used to avoid confusion with the number zero)

Plant Specific Notes:

1. The Fire Rated Doors for the NMP1 Reactor Building, NMP1 Radwaste Solidification Storage Building, NMP1 Waste Disposal Building, NMP1 Offgas Building, NMP2 Reactor Building, NMP2 Control Room Building, NMP2 Essential Yard Structures, NMP2 Radwaste Building, and NMP2 Standby Gas Treatment Building are not identified in NUREG-1801 for this GALL row number.

2. The NMP1 Vent Stack and NMP2 Main Stack steel components are not identified in NUREG-1801 for this GALL row number.

3. The loss of leak tightness is caused by loss of material due to wear.

4. Expansion joints, piping and valves are not identified in NUREG-1801 for this GALL row number.

5. These are small-bore piping and valves.

6. No aging effects requiring management were identified for concrete in any environment; however, NMPNS credits the Structures Monitoring Program for periodically monitoring concrete for potential degradation. Additionally, NMPNS credits the Fire Protection Program for periodically monitoring concrete that also performs a fire barrier intended function.

7. Plug liners are not structural steel; therefore, they are not identified in NUREG-1801 for this GALL row number.

3.6 AGING MANAGEMENT OF ELECTRICAL AND INSTRUMENTATION AND CONTROLS SYSTEMS

3.6.1 INTRODUCTION

This section provides the results of the aging management review for those components identified in Section 2.5, Scoping and Screening Results: Electrical and Instrumentation and Controls Systems. As indicated in Section 2.5, electrical components that are subject to an aging management review are evaluated in Section 2.5.C, NMPNS Electrical Commodities. These commodities apply to both NMP1 and NMP2. The commodities, which are addressed in this section, are described in the indicated sections.

- Cables and Connectors (Section 2.5.C.1)
- Non-Segregated/Switchyard Bus (Section 2.5.C.2)
- Containment Electrical Penetrations (Section 2.5.C.3)
- Switchyard Components (Section 2.5.C.4)

As indicated in Section 2.1.5.4, cables, connectors, and electrical penetrations associated with the 10 CFR 50.49 program (EQ) are defined as short lived (i.e., subject to replacement based on qualified life) and are addressed by Time Limited Aging Analyses (TLAAs). Therefore, these cables, connectors, and electrical penetrations are not included in the set of electrical components requiring aging management review.

Table 3.6.1, Summary of Aging Management Programs for the Electrical and Instrumentation and Controls Components Evaluated in Chapter VI of NUREG-1801, provides the summary of the programs evaluated in NUREG-1801 for the Electrical and Instrumentation and Controls (I&C) component groups that are relied on for license renewal.

This table uses the format described in Section 3.0. Note that this table only includes results for those component groups that are applicable to a BWR.

3.6.2 RESULTS

The following tables summarize the results of the aging management review for the commodities in the Electrical and I&C group.

- Table 3.6.2.C-1 Electrical and I&C Systems - Cables and Connectors – Summary of Aging Management Evaluation
- Table 3.6.2.C-2 Electrical and I&C Systems - Non-Segregated/Switchyard Bus – Summary of Aging Management Evaluation
- Table 3.6.2.C-3 Electrical and I&C Systems - Containment Electrical Penetrations – Summary of Aging Management Evaluation
- Table 3.6.2.C-4 Electrical and I&C Systems - Switchyard Components – Summary of Aging Management Evaluation

The materials from which specific components are fabricated, the environments to which components are exposed, the aging effects requiring management, and the aging management programs used to manage these aging effects are provided for each of the above commodities in the following subsections of Section 3.6.2.1, Materials, Environments, Aging Effects Requiring Management, and Aging Management Programs:

- Section 3.6.2.1.1, Cables and Connectors
- Section 3.6.2.1.2, Non-Segregated/Switchyard Bus
- Section 3.6.2.1.3, Containment Electrical Penetrations
- Section 3.6.2.1.4, Switchyard Components

3.6.2.1 Materials, Environments, Aging Effects Requiring Management and Aging Management Programs

3.6.2.1.1 Cables and Connectors

Materials

The materials of construction for the Cables and Connectors are:

- Copper, Brass, Steel or Alloy (Fuse Holders)
- Various Organic Polymers

Environments

The Cables and Connectors are exposed to the following environments:

- Adverse localized environment caused by heat
- Adverse localized environment caused by moisture and voltage stress.
- Adverse localized environment caused by radiation
- Air

Aging Effects Requiring Management

The following aging effects, associated with the Cables and Connectors components, require management:

- Loss of Electrical Continuity
- Loss of Insulation Resistance

Aging Management Programs

The following aging management programs manage the aging effect for the Cables and Connectors:

- Non-EQ Electrical Cables and Connections Program
- Non-EQ Electrical Cables Used in Instrumentation Circuits Program
- Non-EQ Inaccessible Medium Voltage Cables Program

Additionally, NMPNS credits the Fuse Holder Inspection Program for identifying potential age-related degradation for fuse holders.

3.6.2.1.2 Non-Segregated/Switchyard Bus

Materials

The materials of construction for the Non-Segregated/Switchyard Bus are:

- Aluminum
- Carbon Steel, Low Alloy Steel (Yield Strength < 100 Ksi) and Ductile/Malleable Cast Iron
- Cement
- Porcelain

Environment

The Non-Segregated/Switchyard Bus is exposed to the following environment:

- Air

Aging Effects Requiring Management

There are no aging effects, associated with the Non-Segregated/Switchyard Bus, which require management.

Aging Management Programs

Since there are no aging effects, associated with the Non-Segregated/Switchyard Bus, that require management, no aging management programs are required for license renewal for the Non-Segregated/Switchyard Bus. Nevertheless, NMPNS credits the Non-Segregated Bus Inspection Program for periodically monitoring the non-segregated bus for potential degradation per industry operating experience.

3.6.2.1.3 Containment Electrical Penetrations

Material

The material of construction for the Containment Electrical Penetrations is:

- Various Organic Polymers

Environment

The Containment Electrical Penetrations are exposed to the following environment:

- Air

Aging Effects Requiring Management

There are no aging effects, associated with the Containment Electrical Penetrations, which require management.

Aging Management Programs

Since there are no aging effects, associated with the Containment Electrical Penetrations, that require management, no aging management programs are required for license renewal for the Containment Electrical Penetrations.

3.6.2.1.4 Switchyard Components

Materials

The materials of construction for the Switchyard Components are:

- Aluminum
- Aluminum Conductor-Steel Reinforced
- Cement
- Metal
- Porcelain

Environment

The Switchyard Components are exposed to the following environment:

- Air

Aging Effects Requiring Management

There are no aging effects, associated with the Switchyard Components, which require management.

Aging Management Programs

Since there are no aging effects, associated with the Switchyard Components, that require management, no aging management programs are required for license renewal for the Switchyard Components.

3.6.3 TIME-LIMITED AGING ANALYSES

The Time-Limited Aging Analyses (TLAAs) identified below are associated with the Electrical and I&C Systems. The section of the LRA that contains the TLAA review results is indicated in parenthesis.

- Environmental Qualification (Section 4.4)

3.6.4 CONCLUSIONS

The Electrical and I&C components that are subject to aging management review have been identified in accordance with the requirements of 10 CFR 54.4. The aging management programs selected to manage aging effects for the Electrical and I&C components are identified in the summary tables and Section 3.6.2. A description of these aging management programs is provided in Appendix B, along with the demonstration that the identified aging effects will be managed for the period of extended operation. Therefore, based on the demonstrations provided in Appendix B, the effects of aging associated with the Electrical and I&C 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 Programs for the Electrical and I&C Systems Components Evaluated in Chapter VI of NUREG-1801

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	Further evaluation of degradation due to various aging mechanisms is provided in Appendix B3.1, Environmental Qualification Program, and Section 4.4, Environmental Qualification.
3.6.1-02	Electrical cables and connections not subject to 10 CFR 50.49 EQ requirements	Embrittlement, cracking, melting, discoloration, swelling or loss of dielectric strength leading to reduced insulation resistance (IR); electrical failure, caused by thermal/ thermoxidative degradation of organics; radiolysis and photolysis (ultraviolet [UV] sensitive materials only) of organics; radiation-induced oxidation; moisture intrusion	Aging management program for electrical cables and connections not subject to 10 CFR 50.49 EQ requirements	No	Consistent with NUREG-1801.

Table 3.6.1 Summary of Aging Management Programs for the Electrical and I&C Systems Components Evaluated in Chapter VI of NUREG-1801

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.6.1-03	Electrical cables used in instrumentation circuits not subject to 10 CFR 50.49 EQ requirements that are sensitive to reduction in conductor insulation resistance	Embrittlement, cracking, melting, discoloration, swelling or loss of dielectric strength leading to reduced IR; electrical failure, caused by thermal/ thermoxidative degradation of organics; radiation-induced oxidation; moisture intrusion	Aging management program for electrical cables used in instrumentation circuits not subject to 10 CFR 50.49 EQ requirements	No	Consistent with NUREG-1801.
3.6.1-04	Inaccessible medium-voltage (2kV to 15kV) cables (e.g., installed in conduit or direct buried) not subject to 10 CFR 50.49 EQ requirements	Formation of water trees; localized damage leading to electrical failure (breakdown of insulation), caused by moisture intrusion and water trees	Aging management program for inaccessible medium-voltage cables not subject to 10 CFR 50.49 EQ requirements	No	Consistent with NUREG-1801.
3.6.1-05	PWR only				

Table 3.6.2.C-1 Electrical and I&C Systems
Cables and Connectors – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Cables	EC	Various Organic Polymers	Adverse localized environment caused by heat	Loss of Electrical Continuity and Loss of Insulation Resistance	Non-EQ Electrical Cables and Connections Program	VI.A.1-a	3.6.1-02	A, 1, 2, 6
					Non-EQ Electrical Cables Used in Instrumentation Circuits Program	VI.A.1-b	3.6.1-03	A, 1, 2, 6
			Adverse localized environment caused by radiation	Loss of Electrical Continuity and Loss of Insulation Resistance	Non-EQ Electrical Cables and Connections Program	VI.A.1-a	3.6.1-02	A, 1, 3 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.6.2.C-1 Electrical and I&C Systems
Cables and Connectors – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Cables (cont'd)	EC	Various Organic Polymers	Adverse localized environment caused by radiation	Loss of Electrical Continuity and Loss of Insulation Resistance	Non-EQ Electrical Cables Used in Instrumentation Circuits Program	VI.A.1-b	3.6.1-03	A, 1, 3 6
			Air	None	None			None, 6
Connectors	EC	Various Organic Polymers	Air	None	None			None, 6
Inaccessible Medium-voltage Cables	EC	Various Organic Polymers	Adverse localized environment caused by moisture and voltage stress.	Loss of Electrical Continuity and Loss of Insulation Resistance	Non-EQ Inaccessible Medium Voltage Cables Program	VI.A.1-c	3.6.1-04	A, 1, 6
Splices	EC	Various Organic Polymers	Air	None	None			None, 6
Fuse Blocks	EC	Various Organic Polymers	Air	None	None			H, 4, 6
		Copper, Brass, Steel or Alloy (Fuse Holders)	Air	None	Fuse Holder Inspection Program			H, 4
Terminal Blocks	EC	Various organic Polymers	Air	None	None			None, 6

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.6.2.C-2 Electrical and I&C Systems
Non-Segregated/Switchyard Bus – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Insulators	EI NFS	Cement	Air	None	None			None
		Porcelain	Air	None	None			None
		Metal	Air	None	None			None
Non-Segregated Bus	EC	Aluminum	Air	None	Non-Segregated Bus Inspection Program			H, 5
Switchyard Bus	EC	Aluminum	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.6.2.C-3 Electrical and I&C Systems
Containment Electrical Penetrations – Summary of Aging Management Evaluation[1]

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
Containment Electrical Penetrations	EC PB	Various Organic Polymers	Air	None	None			None, 6

[1] The structural steel portion of the primary containment electrical penetrations is evaluated in the NMP1 Primary Containment Structure (Table 3.5.2.A-1) and the NMP2 Primary Containment Structure (Table 3.5.2.B-1).

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Table 3.6.2.C-4 Electrical and I&C Systems
Switchyard Components – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
High Voltage Insulators	EI NFS	Cement	Air	None	None			None
		Porcelain	Air	None	None			None
		Metal	Air	None	None			None
Transmission Conductors	EC	Aluminum Conductor-Steel Reinforced	Air	None	None			None

See Table 2.0-1 for definitions of Intended Functions, Table 3.0-1 for descriptions of Environments, and Table 3.0-2 for descriptions of Aging Effects.

Notes for Tables 3.6.2.C-1 through 3.6.2.C-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 item for material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

D. Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.

E. Consistent with NUREG-1801 for material, environment, and aging effect, but a different aging management program is credited.

F. Material not in NUREG-1801 for this component.

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

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

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

J. Neither the component nor the material and environment combination is evaluated in NUREG-1801.

K. Material and environment not in NUREG-1801 for this component and aging effect.

L. Aging effect and environment not in NUREG-1801 for this component and material.

M. Aging effect and material not in NUREG-1801 for this component and environment.

N. Aging effect, material, and environment not in NUREG-1801 for this component.

P. Component and aging effect not in NUREG-1801 for this material and environment.

Q. Component not in NUREG-1801 for this material, environment, and aging effect.

(Note “O” was not used to avoid confusion with the number zero)

Plant Specific Notes:

1. The Aging Effects Requiring Management of Loss of Electrical Continuity and Loss of Insulation Resistance are equivalent in nature to the aging effects of embrittlement, cracking, melting, discoloration, swelling, or loss of dielectric strength (NUREG-1801, Volume 2, Items VI.A.1-a and VI.A.1-b) and formation of water trees, localized damage leading to electrical failure (NUREG-1801, Volume 2, Item VI.A.1-c). Specifically, Loss of Electrical Continuity is an electrical failure of a conductor due to a change in conductor properties at the point of an electrical connection, caused by either vibration or thermal expansion/contraction. Loss of Insulation Resistance is an electrical failure due to embrittlement, cracking, melting, or discoloration leading to reduced insulation resistance, caused by:

    - Thermal/thermoxidative degradation of organic materials, radiolysis and photolysis (UV sensitive materials only);
    - Radiation-induced oxidation;
    - Moisture intrusion (water treeing); or
    - Environmental contamination (high voltage insulators)

2. This environment applies to the Nine Mile Point Unit 1 cables located in the upper levels of the primary containment (drywell).

3. This environment applies to the Nine Mile Point Unit 2 cables located in the main steam tunnel and the primary containment (drywell).

4. No aging effects requiring management were identified for fuse holders in any environment; however, industry guidance and Interim Staff Guidance ISG-05 have identified potential aging effects. NMPNS credits the Fuse Holders Program for identifying potential age-related degradation for fuse holders.

5. No aging effects requiring management were identified for 4160 Volt non-segregated bus in any environment; however, industry guidance and operating experience has identified potential aging effects. NMPNS credits the Non-Segregated Bus Inspection Program for periodically monitoring non-segregated busses for potential degradation.

6. The NMPNS various organic polymers include Cross Linked Polyethylene – Vulkene (XLPE), Diallyl Phthylate (DLPE), Epoxy Fiberglass, Glass Melamine (GMG), High Density Polyethylene (HDPE), Hypalon (CSPE), Kapton, Kerite (EPR, EP, and EPDM), Kynar (PVDF), Neoprene, Phenolic, Polysulfone, Polyurethane (PE), Polyvinyl Cloride (PVC), Silicone Rubber (SR), Teflon, Tefzel (ETFE), and Viton.

4.0 TIME-LIMITED AGING ANALYSES

This section of the NMPNS License Renewal Application (LRA) deals with the identification and evaluation of Time-Limited Aging Analyses (TLAAs).

4.1 IDENTIFICATION OF TLAAS

The definition of a TLAA is provided in §54.3(a) as noted below:

> “Time-limited aging analyses, for the purposes of this part, are those licensee calculations and analyses that:
>
> (1) Involve systems, structures, and components within the scope of license renewal as delineated in §54.4(a);
>
> (2) Consider the effects of aging;
>
> (3) Involve time-limited assumptions defined by the current operating term, for example, 40 years;
>
> (4) Were determined to be relevant by the licensee in making a safety determination;
>
> (5) Involve conclusions or provide the basis for conclusions related to the capability of the system, structure, and component to perform its intended functions, as delineated in §54.4(b); and
>
> (6) Are contained or incorporated by reference in the CLB.”

10 CFR 54 requires that a list of TLAAs (as defined above) be provided in the LRA. Evaluation of each TLAA is to include a resolution (from §54.21(c)(1)) as follows:

> “The applicant shall demonstrate that –
>
> (i) The analyses remain valid for the period of extended operation;
>
> (ii) The analyses have been projected to the end of the period of extended operation; or
>
> (iii) The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.”

10 CFR 54 also requires that all plant-specific license exemptions granted pursuant to §50.12 and in effect that are based on TLAAs be identified and evaluated to justify continuation into the period of extended operation.

4.1.1 PROCESS OVERVIEW

Two methods were used to identify potential TLAAs. The first method comprised a review of TLAAs previously identified by the industry and choosing those generically applicable to NMPNS. Sources included:

- The Statements of Consideration accompanying 10 CFR 54;
- Chapter 4 in NUREG-1800, Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants (Reference 4.8-1);
- NEI 95-10, Industry Guidelines for Implementing the Requirements of 10 CFR 54 – The License Renewal Rule (Reference 4.8-2);
- Previously submitted LRAs; and
- Proposed ISG-16, Information to be included in the License Renewal Application (LRA) for Time-Limited Aging Analyses (TLAAs) (enclosure to Reference 4.8-3).

The second method comprised searches of the NMPNS current licensing basis (CLB) for additional calculations/analyses with a time-sensitive element. For docketed correspondence existing on electronic media, automated searches (using appropriate “key words”) were performed; for parts of the CLB not accessible electronically, this task was done manually. The list of all plant calculations was also reviewed to improve the thoroughness of the TLAA search.

The potential TLAAs were screened to determine if they met the definition presented in §54.3. Those determined to be applicable to NMPNS are listed in Table 4.1-1; evaluations are presented in the specified sections. The listed TLAAs apply to both NMP1 and NMP2 unless specifically noted.

4.1.2 IDENTIFICATION OF EXEMPTIONS

NMPNS exemptions were identified through a review of docketed correspondence. Each exemption was then reviewed for TLAA applicability. No TLAA-based exemptions were identified for NMPNS.

Table 4.1-1
Time-Limited Aging Analyses Applicable to NMPNS

TLAA Category	Description	Disposition Category	Section
1.	**Reactor Vessel Neutron Embrittlement Analysis**		4.2
	Upper-shelf Energy	§54.21(c)(1)(ii)	4.2.1
	Pressure-Temperature (P-T) Limits	§54.21(c)(1)(ii)	4.2.2
	Elimination of Circumferential Weld Inspection (NMP1 only)	§54.21(c)(1)(ii)	4.2.3
	Axial Weld Failure Probability	§54.21(c)(1)(ii)	4.2.4
2.	**Metal Fatigue Analysis**		4.3
	Reactor Vessel Fatigue Analysis	§54.21(c)(1)(iii)	4.3.1
	ASME Section III Class 1 Piping and Components Fatigue Analysis (NMP2 only)	§54.21(c)(1)(iii)	4.3.2
	Feedwater (FWS) Nozzle and Control Rod Drive Return Line (CRDRL) Nozzle Fatigue and Cracking Analyses	§54.21(c)(1)(iii)	4.3.3
	Non-ASME Section III Class 1 Piping and Components Fatigue Analysis	§54.21(c)(1)(iii)	4.3.4
	Reactor Vessel Internals Fatigue Analysis	§54.21(c)(1)(iii)	4.3.5
	Environmentally Assisted Fatigue	§54.21(c)(1)(iii)	4.3.6
	Fatigue of the Emergency Condenser (NMP1 only)	§54.21(c)(1)(iii)	4.3.7
3.	**Environmental Qualification (EQ)**		4.4
	Electrical Equipment EQ	§54.21(c)(1)(iii)	4.4.1
	Mechanical Equipment EQ (NMP2 only)	§54.21(c)(1)(iii)	4.4.2
4.	**Concrete Containment Tendon Prestress Analysis**		4.5
5.	**Containment Liner Plate, Metal Containments, and Penetrations Fatigue Analysis**		4.6
	Torus Shell and Vent System Fatigue Analysis (NMP1 only)	§54.21(c)(1)(i) and §54.21(c)(1)(ii)	4.6.1
	Torus Attached Piping Analysis (NMP1 only)	§54.21(c)(1)(ii)	4.6.2
	Torus Wall Thickness (NMP1 only)	§54.21(c)(1)(iii)	4.6.3
	Containment Liner Analysis (NMP2 only)	§54.21(c)(1)(ii)	4.6.4
6.	**Other Plant-specific TLAAs**		4.7
	RPV Biological Shield (NMP2 only)	§54.21(c)(1)(ii)	4.7.1
	Main Steam Isolation Valve Corrosion Allowance (NMP2 only)	§54.21(c)(1)(i)	4.7.2
	Stress Relaxation of Core Plate Hold-Down Bolts (NMP2 only)	§54.21(c)(1)(iii)	4.7.3
	Reactor Vessel and Reactor Vessel Closure Head Weld Flaw Evaluations (NMP1 only)	§54.21(c)(1)(i) and §54.21(c)(1)(iii)	4.7.4

4.2 REACTOR VESSEL NEUTRON EMBRITTLEMENT ANALYSIS

4.2.1 UPPER-SHELF ENERGY

Summary Description

Ferritic Reactor Pressure Vessel (RPV) materials undergo a transition in fracture behavior from brittle to ductile as the temperature of the material is increased. Charpy V-notch tests are conducted in the nuclear industry to monitor changes in the fracture behavior during irradiation. Neutron irradiation to fluences above approximately $1x10^{17}$ n/cm^2 causes an upward shift in the ductile-to-brittle transition temperature and a drop in upper-shelf energy (USE).

To satisfy the acceptance criteria for USE contained in 10 CFR 50 Appendix G, the RPV beltline materials must have a Charpy USE of no less than 50 ft-lbs throughout the life of the RPV unless it can be demonstrated that lower values of Charpy USE will provide margins of safety against fracture equivalent to those required by Appendix G of Section XI of the ASME Code.

Appendix B to *BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines for License Renewal* (BWRVIP-74-A) (Reference 4.8-4) presents an equivalent margin analysis establishing the minimum USE limits for beltline materials used in BWR/2 through BWR/6 RPV designs, as well as the Plant Applicability Verification Form for Equivalent Margin Analysis corresponding to irradiation for 54 Effective Full-Power Years (EFPY). The minimum USE values, equivalent margin analysis USE limit criteria, and bounding criteria for decrease in Charpy USE were accepted by the NRC in the Safety Evaluation Report (SER) for BWRVIP-74-A (Reference 4.8-5).

The end-of-life USE calculations for RPV beltline materials at NMPNS satisfy the criteria of §54.3(a). As such, any related analysis is a TLAA.

Analysis

The NRC issued Generic Letter (GL) 92-01, Revision 1, on March 6, 1992 (Reference 4.8-6), as a part of a program to evaluate RPV integrity and to ensure that licensees are complying with §50.60 and §50.61 and fulfilling commitments made in response to GL 88-11 (Reference 4.8-7).

In response to GL 92-01, NMP1 and NMP2 submitted reports on July 2, 1992 (Reference 4.8-8 and Reference 4.8-9, respectively), documenting compliance with §50.60 and §50.61 and the guidance provided in Regulatory

Guide (RG) 1.99, Revision 2 (Reference 4.8-10). The NRC staff reviewed the reports and accepted the information for use in future assessments of vessel structural integrity for NMP1 (Reference 4.8-11) and NMP2 (Reference 4.8-12).

The original NMP1 response (Reference 4.8-8) also identified two RPV beltline plates (G-307-4 and G-8-1) with predicted Charpy USE below the 50 ft-lb screening criterion, based on the conservative models of RG 1.99. By letters dated December 17, 1992 (Reference 4.8-13), and February 26, 1993 (Reference 4.8-14), Niagara Mohawk Power Corporation (NMPC) submitted additional reports (entitled *Elastic-Plastic Fracture Mechanics Assessment of NMP1 Beltline Plates for Service Level A and B Loadings* and *Elastic-Plastic Fracture Mechanics Assessment for Service Level C and D Loadings*, respectively) documenting equivalent margin analyses for these two plates. The NRC staff, with assistance from its contractor, Oak Ridge National Laboratory (ORNL), reviewed these reports. Based on their own review and the technical evaluation report by ORNL, the NRC staff concluded that the specified NMP1 RPV plates have adequate margins of safety against fracture until the end-of-life (meaning the original 40-year license) for all Level conditions (A, B, C, and D) and meet the criteria in ASME Section XI Code Case N-512 (Reference 4.8-15).

Disposition: §54.21(c)(1)(ii) – The analyses have been projected to the end of the period of extended operation.

Projections of USE values for RPV beltline materials were calculated and are presented in Table 4.2-1 and Table 4.2-2 for NMP1 and NMP2, respectively. These values are based on irradiation for 54 EFPY, which corresponds to an average capacity factor of 90% over 60 years and is consistent with the bounding analyses in Reference 4.8-4. Neutron transport modeling was carried out in R-θ and R-Z geometry using the DORT two-dimensional discrete ordinates code and the BUGLE-96 cross section library. The NRC staff concluded that this methodology satisfies the criteria of RG 1.190 (Reference 4.8-16).

The NMP1 RPV is a BWR/2 design. The NMP1 surveillance materials are not the limiting materials for the vessel beltline, with respect to the reduction in USE, for either plates or welds (Reference 4.8-16). Thus, the USE projections for both weld and plate materials used the approach for BWR/2 found in Appendix B to BWRVIP-74-A (Reference 4.8-4) and the limit lines from Figure 2 of RG 1.99, Revision 2 (Reference 4.8-10). The USE for two RPV beltline plates was projected to fall below the 50 ft-lb requirement of 10 CFR 50 Appendix G; therefore, an analysis was performed to verify the vessel has an equivalent margin of safety against fracture to that required by 10 CFR 50 Appendix G. An NMP1 submittal dated March 22, 2004

(Reference 4.8-46) contains a more detailed reevaluation of the upper-shelf energy and equivalent margins analysis through the end of the period of extended operation.

Table 4.2-1b presents the *Equivalent Margin Analysis Plant Applicability Verification Form* (similar to Tables B-3 of (Reference 4.8-4) for the NMP1 limiting plate. This form verifies that the measured percent reduction in USE for the surveillance plate is bounded by the predicted reduction in USE using the methodology of RG 1.99 Revision 2, and that the predicted reduction in USE for the limiting beltline plate is bounded by the reduction found acceptable for the limiting BWR/2 plate by the generic equivalent margins analysis. Table 4.2-1c presents the *Equivalent Margin Analysis Plant Applicability Verification Form* (Similar to Table B-5 of (Reference 4.8-4) for the NMP1 limiting weld. This form verifies that the predicted reduction in USE for the limiting beltline weld is bounded by the reduction in USE found acceptable for the limiting BWR/2-6 weld by the generic equivalent margins analysis. Note that USE was not measured for the unirradiated surveillance weld, so a comparison of the measured percent decrease versus predicted percent decrease is not possible for the surveillance weld.

The NMP2 RPV is a BWR/5 design. Since only one surveillance data point is available (Reference 4.8-17), the limit lines from Figure 2 of RG 1.99, Revision 2, are used in conjunction with the copper content and projected 1/4T fluence for the limiting RPV beltline materials to predict USE at the end of the period of extended operation.

Although NMP2 is not crediting an equivalent margins analysis, for informational purposes Tables 4.2-2b and 4.2-2c present the *Equivalent Margin Analysis Plant Applicability Verification Forms* (similar to Tables B-4 and B-5 of (Reference 4.8-4) for the NMP2 limiting plates and weld. These forms verify that the percent reduction in USE for the surveillance plate and weld are bounded by the predicted reduction in USE using the methodology of RG 1.99 Rev. 2, and that the predicted reduction in USE for the limiting beltline plate and weld are bounded by the reduction in USE found acceptable for the limiting BWR/3-6 plates and welds by the generic equivalent margins analysis.

The USE for the limiting beltline weld materials for NMP1 and NMP2 and the limiting beltline plate materials for NMP2 is predicted to remain above 50 ft-lbs throughout the period of extended operation, based on projected fluence values. The USE of the limiting plate material for NMP1 is below 50 ft-lbs but is predicted to remain above the value required by an equivalent margins analysis, based on projected fluence values. Therefore, the USE for the NMP1 and NMP2 RPV beltline materials has been projected (reevaluated) for the period of extended operation in accordance with §54.21(c)(1)(ii).

Table 4.2-1a
NMP1 Weld and Plate USE Projection for 54 EFPY

Material ID	Projected Fluence (n/cm^2)		Copper Content (Weight %)	Minimum Unirradiated USE (ft-lb) (NOTE 2)	Projected USE (ft-lb)	Conclusion
	Vessel IR (NOTE 1)	1/4T (NOTE 1)				
Plate G-8-1 (NOTE 3)	5.21×10^{18}	3.39×10^{18}	0.236	53.3 (NOTE 4)	40	Acceptable (NOTE 5)
Plate G-307-4 (NOTE 3)	5.21×10^{18}	3.39×10^{18}	0.27	52 (NOTE 4)	37.2	Acceptable (NOTE 5)
Weld 1248 (NOTE 6)	5.21×10^{18}	3.39×10^{18}	0.214	90	64	Acceptable

(NOTE 1) Fluence projections at the surface of the vessel inner radius and 1/4T were scaled up proportionately to 54 EFPY from the 28 EFPY fluence values presented in Section 4.1 of Attachment D to Reference 4.8-76.

(NOTE 2) Data from Reference 4.8-8

(NOTE 3) Copper content from Reference 4.8-18

(NOTE 4) Transverse value - converted from longitudinal

(NOTE 5) Projected decrease in USE is less than the 29.5% decrease assumed in the equivalent margin analysis for BWR/2 plate at 54 EFPY; therefore, this material is bounded by the analysis in Appendix B to BWRVIP-74-A. The minimum required USE value for BWR/2 transverse plate at 54 EFPY is 35 ft-lb (Reference 4.8-4).

(NOTE 6) Copper content from Reference 4.8-19

Table 4.2-1b, Equivalent Margin Analysis Plant Applicability Verification Form for NMP1 Plate (BWR/2 Plate)

Surveillance Plate USE (G-8-1 Heat # P2112):		
Parameter	**Value**	**Reference**
%Cu	0.236	4.8-30
Capsule Fluence	9.34×10^{17} n/cm^2	4.8-77
Measured % Decrease	1.04 (Charpy Curves)	4.8-77
R.G. 1.99 Predicted % Decrease	19 (R.G. 1.99, Figure 2)	
Limiting Beltline Plate USE (G-307-4 Heat # P2076):		
Parameter	**Value**	**Reference**
%Cu	0.27	4.8-30
54 EFPY Fluence	3.39×10^{18} n/cm^2 (NOTE 1)	
R.G. 1.99 Predicted % Decrease	28.5 (R.G. 1.99, Figure 2)	
Adjusted % Decrease	N/A R.G. 1.99, Position 2.2)	
28.5% ≤ 29.5%, so vessel plates are bounded by equivalent margin analysis		

(NOTE 1) Scaled up from 28 EFPY fluence of 1.76×10^{18} n/cm^2 from Reference 4.8-76

Table 4.2-1c, Equivalent Margin Analysis Plant Applicability Verification Form for NMP1 Weld (BWR/2-6 Weld)		
Surveillance Weld USE (Heat W5214) (NOTE 1)		
Parameter	**Value**	**Reference**
%Cu		
Capsule Fluence		
Measured % Decrease	(Charpy Curves)	
R.G. 1.99 Predicted % Decrease	(R.G. 1.99, Figure 2)	
Limiting Beltline Weld USE (3-564 Heat # 1248):		
Parameter	**Value**	**Reference**
%Cu	0.214	Reference 4.8-19
54 EFPY Fluence	3.39×10^{18} n/cm^2 (NOTE 2)	
R.G. 1.99 Predicted % Decrease	28.5 (R.G. 1.99, Figure 2)	
Adjusted % Decrease	N/A (R.G. 1.99, Position 2.2)	
28.5% ≤ 39%, so vessel welds are bounded by equivalent margin analysis		

(NOTE 1) Information is not provided for the surveillance weld because the unirradiated USE was not measured (References 4.8-8, 4.8-30).

(NOTE 2) Scaled up from 28 EFPY fluence of 1.76×10^{18} n/cm^2 from Reference 4.8-76.

Table 4.2-2a
NMP2 Weld and Plate USE Projection for 54 EFPY

Material ID	Projected Fluence (n/cm^2)		Copper Content (Weight %)(NOTE 1)	Minimum Unirradiated USE (ft-lb) (NOTE 1)	Projected USE (ft-lb)	Conclusion
	Vessel IR (NOTE 2)	1/4T (NOTE 3)				
Plate C-3147-1	1.45×10^{18}	9.70×10^{17}	0.11	70 (NOTE 4)	62.3	Acceptable
Plate C-3147-2	1.45×10^{18}	9.70×10^{17}	0.11	86 (NOTE 4)	76.5	Acceptable
Weld 5P5657/0931 (NOTE 5)	1.45×10^{18}	9.70×10^{17}	0.07	85	74	Acceptable

(NOTE 1) Data from Reference 4.8-9

(NOTE 2) The Cycle 7 (8.72 EFPY) inner surface fluence projection (1.95×10^{17} n/cm^2, presented in Section 3.5 of the attachment to (Reference 4.8-20) was extrapolated to 54 EFPY using the Cycle 7 average flux value (8.78×10^{8} n/cm^2-s).

(NOTE 3) Fluence projection at 1/4T was determined by multiplying the extrapolated (54 EFPY) inner surface fluence projection by 0.67 (the ratio of 1/4T-to-inner surface fluence reported in Section 3.5 of the attachment to (Reference 4.8-20).

(NOTE 4) Transverse value

(NOTE 5) Single wire submerged arc process

Table 4.2-2b, Equivalent Margin Analysis Plant Applicability Verification Form for NMP2 Plate (BWR/3-6 Plate)

Surveillance Plate USE (C-3147-2):		
Parameter	**Value**	**Reference**
%Cu	0.11	4.8-9
Capsule Fluence	8.49×10^{16} n/cm^2	4.8-20
Measured % Decrease	-12.5 (NOTE 1) (Charpy Curves)	4.8-20
R.G. 1.99 Predicted % Decrease	6 (R.G. 1.99, Figure 2)	
Limiting Beltline Plate USE (C-3147-1, C-3147-2):		
Parameter	**Value**	**Reference**
%Cu	0.11	4.8-9
54 EFPY Fluence	9.70×10^{17} n/cm^2 (NOTE 2)	
R.G. 1.99 Predicted % Decrease	11 (R.G. 1.99, Figure 2)	
Adjusted % Decrease	N/A (RG 1.99, Position 2.2)	
11% ≤ 23.5%, so vessel plates are bounded by equivalent margin analysis		

(NOTE 1) Measured USE increased by 12.5%.

(NOTE 2) Fluence was determined as follows: 1/4T fluence at 8.72 EFPY = 1.31×10^{17} n/cm^2 (Reference 4.8-20)
Vessel IR flux from 8.72 EFPY to 54 EFPY is assumed to be equal to the cycle 7 flux of 8.78×10^8 n/cm^2 –sec. from (Reference 4.8-20)
Ratio of 1/4T to inner radius fluence from 22 EFPY projected values in Reference 4.8-20 = 3.76×10^{17} n/cm^2/5.62×10^{17} n/cm^2 = 0.669
Number of seconds from 8.72 to 54 EFPY = 1.42795×10^9 sec
Fluence from 8.72 to 54 EFPY = (8.78×10^8 n/cm^2-sec)(0.669)(1.42795×10^9 sec)=8.39×10^{17} n/cm^2
8.39×10^{17} n/cm^2 +1.31×10^{17} n/cm^2 = 9.70×10^{17} n/cm^2

Table 4.2-2c, Equivalent Margin Plant Applicability Verification Form for NMP2 Weld (BWR/2-6 Weld)		
Surveillance Weld USE (Weld 5P5657(t)) (NOTE 1)		
Parameter	**Value**	**Reference**
%Cu	0.04	4.8-20
Capsule Fluence	8.49×10^{16} n/cm^2	4.8-20
Measured % Decrease	-11.5% (Charpy Curves)	4.8-20
R.G. 1.99 Predicted % Decrease	6 (R.G. 1.99, Figure 2)	
Limiting Beltline Weld USE (Weld 5P5657(s))		
Parameter	**Value**	**Reference**
%Cu	0.07	4.8-9
54 EFPY Fluence	9.70×10^{17} n/cm^2 (NOTE 2)	
R.G. 1.99 Predicted % Decrease	13 (R.G. 1.99, Figure 2)	
Adjusted % Decrease	NR	
13% ≤ 39%, so vessel welds are bounded by equivalent margin analysis		

(NOTE 1) Tandem wire process(Reference 4.8-20)

(NOTE 2) Fluence was determined as follows: 1/4T fluence at 8.72 EFPY = 1.31×10^{17} n/cm^2 (Reference 4.8-20)
Vessel IR flux from 8.72 EFPY to 54 EFPY is assumed to be equal to the cycle 7 flux of 8.78×10^8 n/cm^2 –sec from (Reference 4.8-20).
Ratio of 1/4T to inner radius fluence from 22 EFPY projected values in (Reference 4.8-20) = 3.76×10^{17} n/cm^2/5.62×10^{17} n/cm^2 = 0.669
Number of seconds from 8.72 to 54 EFPY = 1.42795×10^9 sec
Fluence from 8.72 to 54 EFPY = (8.78×10^8 n/cm^2-sec)(0.669)(1.42795×10^9 sec)=8.39×10^{17} n/cm^2
8.39×10^{17} n/cm^2 + 1.31×10^{17} n/cm^2 = 9.70×10^{17} n/cm^2

4.2.2 PRESSURE - TEMPERATURE (P – T) LIMITS

Summary Description

10 CFR 50 Appendix G requires that the RPV be operated within established pressure-temperature (P-T) limits during heatup and cooldown. These limits specify the maximum allowable pressure as a function of reactor coolant temperature. NMP1 and NMP2 Technical Specifications contain P-T limit curves for heatup, cooldown, inservice leakage testing, and hydrostatic testing, and limit the maximum rate of change of reactor coolant temperature.

The P-T limit curves are periodically revised to account for changes in fracture toughness of the RPV components due to anticipated neutron embrittlement effects for higher accumulated fluences. Calculation of P-T limit curves using the projected fluence at the end of the period of extended operation would result in unnecessarily restrictive operating curves. However, projection of the Adjusted Reference Temperature (ART), which is used in development of the curves, to the end of the period of extended operation provides assurance that development of P-T limit curves will be feasible up to the maximum predicted EFPY. There are no regulatory requirements for the maximum ART for BWRs. The need to minimize the ART is driven by operational considerations.

Calculations that project ART values at NMPNS satisfy the criteria of §54.3(a). As such, any related analysis is a TLAA.

Analysis

The current P-T limit curves for NMP1 (Reference 4.8-21) and NMP2 (Reference 4.8-22) were calculated for exposures within the 32 EFPY operating period anticipated during the original 40-year plant licenses. As reported in Reference 4.8-16 (for NMP1) and Reference 4.8-17 (for NMP2; reaffirmed by Reference 4.8-23), vessel plate material in the core beltline region constitutes the limiting material at each plant; thus, the methodology of RG 1.99, Revision 2, was used to determine ART projections used in development of these curves.

Disposition: §54.21(c)(1)(ii) – The analyses have been projected to the end of the period of extended operation.

Projections of ART values for beltline materials, based on extrapolation using the most recent fluence results and fracture toughness data from surveillance capsule and P-T operating curve reporting, are found in Table 4.2-3 and Table 4.2-4 for NMP1 and NMP2, respectively. The NMP1 values were computed for 46 EFPY, based on adding irradiation corresponding to an average capacity factor of 90% during the 20-year period of extended operation to the 28 EFPY exposure currently projected for the end of the original license term. The NMP2 values are based on irradiation for 54 EFPY, which corresponds to an average capacity factor of 90% over 60 years. In Reference 4.8-16, the NRC staff concluded that the supporting fluence calculations were performed using methods consistent with RG 1.190.

For NMP1 and NMP2, projections of the ART values for the beltline materials have been made for the period of extended operation, providing reasonable assurance that it will be possible to prepare P-T curves that will permit continued plant operation. The P-T curves (and the related Technical Specifications) will continue to be updated either as required by 10 CFR 50, Appendix G, to assure the operational limits remain valid at the current cumulative neutron fluence levels, or on an as-needed basis to provide appropriate operational flexibility. Therefore, reevaluation of the P-T Limits to consider the period of extended operation by using 10 CFR 50 Appendix G will be performed in accordance with §54.21(c)(1)(ii).

Table 4.2-3
Estimated ART of NMP1 Beltline Materials at 46 EFPY (NOTE 1)

Material ID or Weld Seam Number	Projected Fluence (n/cm^2)		RG 1.99 Fluence Factor	Chemistry (wt %)		RG 1.99 Chemistry Factor	Temperatures (°F) (NOTE 4)			
	Vessel IR (NOTE 2)	1/4T (NOTE 3)		Copper	Nickel		Initial RT_{NDT}	ΔRT_{NDT}	Margin	ART
G-307-4/5	4.44×10^{18}	2.89×10^{18}	0.66	0.27	0.53	173.85	40	114.7	34	188.7
G-307-3	4.44×10^{18}	2.89×10^{18}	0.66	0.20	0.48	134.60	28	88.8	34	150.8
G-307-10	4.44×10^{18}	2.89×10^{18}	0.66	0.22	0.51	148.85	20	98.2	34	152.2
G-8-1 (NOTES 5, 6)	2.97×10^{18}	1.93×10^{18}	0.56	0.236	0.503	228.35	36	127.9	17	180.9
G-8-3/4 (NOTE 6)	2.97×10^{18}	1.93×10^{18}	0.56	0.178	0.573	130.09	-3	72.9	34	103.9
2-564 A/C (NOTE 7)	4.44×10^{18}	2.89×10^{18}	0.66	0.214	0.046	97.6	-50	64.4	56.0	70.4
2-564 D/F (NOTE 7)	4.44×10^{18}	2.89×10^{18}	0.66	0.214	0.046	97.6	-50	64.4	56.0	70.4
3-564 (NOTE 7)	4.44×10^{18}	2.89×10^{18}	0.66	0.214	0.076	99.9	-50	65.9	56.0	71.9

(NOTE 1) Data Source is Table 4-4 in Attachment D to Reference 4.8-76 unless otherwise noted.

(NOTE 2) Maximum fluence projection at the surface of the vessel inner radius was scaled up proportionately from the 28 EFPY fluence value presented in Section 4.1 of Attachment D to Reference 4.8-76.

(NOTE 3) Maximum fluence projection at 1/4T was scaled up proportionately to 46 EFPY from the 28 EFPY fluence value presented in Section 4.1 of Attachment D to Reference 4.8-76. Fluence projections for plates G-8-1 and G-8-3/4 are derived by multiplying the extrapolated (46 EFPY) 1/4T fluence projection by 0.67 (the ratio of 1/4T-to-inner surface fluence reported in Table 4-4 attached to Reference 4.8-24).

(NOTE 4) Initial RT_{NDT} values are for specimens in the transverse orientation.

(NOTE 5) The chemistry factor and margin values for plate G-8-1 are from Reference 4.8-24; surveillance data presented in Reference 4.8-25 resulted in changes to the data presented in Attachment D to Reference 4.8-76.

(NOTE 6) Chemistry data for plates G-8-1 and G-8-3/4 are best estimate values from Table 2-1 in the attachment to Reference 4.8-18.

(NOTE 7) Chemistry and chemistry factor data for welds 2-564 A/C, 2-564 D/F, and 3-564 are from Table 1 in the attachment to Reference 4.8-19.

Table 4.2-4
Estimated ART of NMP2 Beltline Materials at 54 EFPY (NOTE 1)

Material ID	Projected Fluence (n/cm^2)		RG 1.99 Fluence Factor	Chemistry (wt %)		RG 1.99 Chemistry Factor	Temperatures (°F) (NOTE 4)			
	Vessel IR (NOTE 2)	1/4T (NOTE 3)		Copper	Nickel		Initial RT_{NDT}	ΔRT_{NDT}	Margin	ART
C-3065-1	1.45×10^{18}	9.70×10^{17}	0.411	0.06	0.63	37.0	-10	15.2	31.2	36.4
C3121-2	1.45×10^{18}	9.70×10^{17}	0.411	0.09	0.65	58.0	0	23.8	34.3	58.1
C3147-1	1.45×10^{18}	9.70×10^{17}	0.411	0.11	0.63	74.5	0	30.6	37.3	67.9
C3147-2	1.45×10^{18}	9.70×10^{17}	0.411	0.11	0.63	74.5	0	30.6	37.3	67.9
C3066-2	1.45×10^{18}	9.70×10^{17}	0.411	0.07	0.64	44.0	-20	18.1	32.1	30.2
C3065-2	1.45×10^{18}	9.70×10^{17}	0.411	0.06	0.63	37.0	10	15.2	31.2	56.4
5P5657/0931(s)	1.45×10^{18}	9.70×10^{17}	0.411	0.07	0.71	95.0	-60	39.0	41.6	20.6
5P5657/0931(t)	1.45×10^{18}	9.70×10^{17}	0.411	0.04	0.89	54.0	-60	22.2	33.6	-4.2
5P6214B/0331(s)	1.45×10^{18}	9.70×10^{17}	0.411	0.02	0.82	27.0	-50	11.1	30.2	-8.7
5P6214B/0331(t)	1.45×10^{18}	9.70×10^{17}	0.411	0.014	0.70	22.8	-40	9.4	29.9	-0.7
4P7465/0751(s)	1.45×10^{18}	9.70×10^{17}	0.411	0.02	0.82	27.0	-60	11.1	30.2	-18.7
4P7465/0751(t)	1.45×10^{18}	9.70×10^{17}	0.411	0.02	0.80	27.0	-60	11.1	30.2	-18.7
4P7216/0751(s)	1.45×10^{18}	9.70×10^{17}	0.411	0.045	0.80	61.0	-50	25.1	38.8	13.9
4P7216/0751(t)	1.45×10^{18}	9.70×10^{17}	0.411	0.035	0.82	47.5	-80	19.5	33.6	-26.9

(NOTE 1) Data for margin terms from attachment to Reference 4.8-20. Chemistry (best estimate values) and chemistry factor for welds 4P7216/0751(s) and 4P7216/0751(t) from Reference 4.8-26; Cu and Ni content for all other material from Reference 4.8-9.

(NOTE 2) The Cycle 7 (8.72 EFPY) inner surface fluence projection (1.95×10^{17} n/cm^2, presented in Section 3.5 of the attachment to Reference 4.8-20) was extrapolated to 54 EFPY using the Cycle 7 average flux value (8.78×10^{8} n/cm^2-s).

(NOTE 3) Fluence projection at 1/4T was determined by multiplying the extrapolated (54 EFPY) inner surface fluence projection by 0.67 (the ratio of 1/4T-to-inner surface fluence reported in Section 3.5 of the attachment to Reference 4.8-20).

(NOTE 4) Initial RT_{NDT} values are for specimens in the transverse orientation.

4.2.3 ELIMINATION OF CIRCUMFERENTIAL WELD INSPECTION (NMP 1 ONLY)

Summary Description

Relief from reactor vessel circumferential weld examination requirements under GL 98-05, *Boiling Water Reactor Licensees Use Of The BWRVIP-05 Report To Request Relief From Augmented Examination Requirements On Reactor Pressure Vessel Circumferential Shell Welds*, is based on probabilistic assessments that predict an acceptable probability of failure per reactor operating year. The analysis is based on reactor vessel metallurgical conditions as well as flaw indication sizes and frequencies of occurrence that are expected at the end of a licensed operating period.

In Reference 4.8-27, the NRC granted such relief to NMP1 for the remainder of its current 40-year license term. NMP2 has not submitted a relief request for the remainder of its 40 year licensed operating period. Therefore, the supporting evaluation applies only to NMP1. The associated circumferential weld examination relief analysis for NMP1 satisfies the criteria of §54.3(a). As such, this analysis is a TLAA.

Analysis

Pursuant to GL 98-05, NMP1 requested permanent relief from the inservice inspection requirements for the volumetric examination of the circumferential RPV welds (Reference 4.8-28). The NRC staff reviewed the technical justification for the request, concluded that the proposed alternatives to augmented RPV shell weld examination provide an acceptable level of quality and safety, and authorized their use at NMP1 as stated in the associated SER (Reference 4.8-27).

Disposition: §54.21(c)(1)(ii) – The analyses have been projected to the end of the period of extended operation.

Appendix E of *Final Safety Evaluation of the BWR Vessel and Internals Project BWRVIP-05 Report* (Reference 4.8-29) documented an evaluation of the impact of plant life extension from 32 EFPY to 64 EFPY on the conditional probability of vessel failure, P(F|E). This assessment reported that combining the P(F|E) due to circumferential weld failure with the frequency of cold overpressurization events results in a total vessel failure frequency as high as $5x10^{-7}$/yr at 64 EFPY. In the SER for BWRVIP-74-A (Reference 4.8-5), the NRC staff determined that the analysis provides a technical basis for relief from the current inservice inspection requirements of ASME Section XI for volumetric examination of circumferential welds as they may apply for the license renewal period.

Assumptions made in accepting the analysis discussed above are (1) that the applicable neutron fluence is the end-of-life mean fluence, and (2) that the applicable chemistry values are mean values based on vessel types. The results of a scoping evaluation using comparable plant-specific parameters (presented in Table 4.2-5) indicates that projected values of mean and upper bound RT_{NDT} for the limiting circumferential weld at NMP1 is below the bounding mean RT_{NDT} determined by the NRC staff. Thus, there is reasonable assurance the P(F|E) due to NMP1 RPV circumferential weld failure is bounded by the NRC analysis.

The procedures and training that will be used to limit the frequency of cold overpressure events for the license renewal term will be the same as those used in the current licensed operating period for NMP1. A discussion of these procedural controls and training provisions was provided in the NMP1 request for relief for the current operating period (Reference 4.8-28).

NMP1 will apply for relief from circumferential weld inspections for the period of extended operation. Supporting analyses, procedural controls, and operator training will be completed prior to the period of extended operation to support and confirm that the RPV circumferential weld failure probability remains acceptable for the period of extended operation. Based on the scoping evaluation discussed above, there is reasonable assurance the failure probability will remain acceptable for the period of extended operation. Therefore, the analysis supporting elimination of the circumferential weld inspection has been projected in accordance with §54.21(c)(1)(ii).

Table 4.2-5
Information Required to Evaluate the Conditional Probability of Failure of the Limiting NMP1 RPV Circumferential Weld at 64 EFPY

Weld Seam Number or Material ID	Inside Surface Fluence (n/cm^2)	RG 1.99 Fluence Factor (NOTE 1)	Chemistry (wt %)		RG 1.99 Chemistry Factor	Temperatures (°F) (NOTE 2)					Bounding Mean RT_{NDT} (NOTE 5)
			Cu	Ni		Initial RT_{NDT}	ΔRT_{NDT}	Mean RT_{NDT}	Margin	RT_{NDT} (upper bound)	
3-564 (NOTE 3)	3.69×10^{18} (NOTE 4)	0.724	0.214	0.076	99.9	-50	72.3	22.3	56.0	78.3	113.2°F

(NOTE 1) Determined from inside surface fluence using fluence factor equation from Section 1.1 of RG 1.99, Rev. 2.

(NOTE 2) Initial RT_{NDT} values are for specimens in the transverse orientation. Mean RT_{NDT} determined using the method of RG 1.99, Rev. 2, omitting margin term; RT_{NDT} (upper bound) determined by including margin.

(NOTE 3) Weld seam material is from weld wire heat 1248 and weld flux lot 4M2F (Table 1-1 in attachment to Reference 4.8-30). Margin term is from Table 4-4 in Attachment D to Reference 4.8-76. Copper content, nickel content, chemistry factor, and initial RT_{NDT} are values for weld wire heat 1248 from Table 1 in attachment to Reference 4.8-19.

(NOTE 4) Fluence projection at the inner surface of the weld was determined by multiplying the maximum projected fluence (scaled up proportionately to 64 EFPY from the 28 EFPY maximum fluence value presented in Table B-4 of the attachment to Reference 4.8-25 with a 20% uncertainty factor added) by 0.67 (the ratio of core midplane fluence to fluence at circumferential weld location indicated in Table B-6 of the attachment to Reference 4.8-25). As affirmed in Section 6.0 of Attachment 2 to Reference 4.8-31 (accepted by the NRC in Reference 4.8-16), this fluence projection is based on a conservative value.

(NOTE 5) Applicable bounding values reported in Table 2.6-5 of Reference 4.8-29.

4.2.4 AXIAL WELD FAILURE PROBABILITY

Summary Description

In the safety evaluation presented in *Supplement to Final Safety Evaluation of the BWR Vessel and Internals Project BWRVIP-05 Report* (Reference 4.8-32), the NRC staff indicates that the RPV failure frequency due to failure of the limiting axial welds in the BWR fleet at the end of 40 years of operation is less than $5x10^{-6}$ per reactor year, given the assumptions on flaw density, distribution, and location described in the SER.

The associated axial weld failure probability analysis satisfies the criteria of §54.3(a). As such, this analysis is a TLAA.

Analysis

The conclusion in Reference 4.8-32 assumes that "essentially 100%" of the RPV axial welds will be inspected. Inspections of the axial welds are conducted in accordance with the ASME Section XI code requirements at NMP1 and NMP2.

As part of the request for relief from circumferential RPV weld inspection requirements discussed in Section 4.2.3, NMP1 proposed to perform an automated inspection of certain RPV welds in lieu of the NRC requirements for the remainder of its current 40-year license term. The NRC staff reviewed NMP1's basis for not being able to perform 100% examination of all accessible regions of the RPV axial welds, considered the added assurance of flaw detection and sizing associated with the proposed alternative, concluded that the proposed alternatives to augmented RPV shell weld examination provide an acceptable level of quality and safety, and authorized their use at NMP1 as stated in the associated SER (Reference 4.8-27).

Disposition: §54.21(c)(1)(ii) – The analyses have been projected to the end of the period of extended operation.

In the SER for BWRVIP-74-A (Reference 4.8-5), the NRC staff requires license renewal applicants to provide plant-specific information applicable to 60 years of operation for monitoring the axial beltline weld embrittlement.

The pertinent data are provided in Table 4.2-6, including current projections of ART (identical to RT_{NDT}) at 64 EFPY. The results of this scoping evaluation demonstrate that projected values of mean RT_{NDT} and upper bound RT_{NDT} for the limiting axial welds at NMP1 and NMP2 are below the bounding mean RT_{NDT} value determined by the NRC staff. Thus, there is reasonable assurance that the RPV failure frequency due to failure of the limiting axial weld is expected to remain less than $5x10^{-6}$ per reactor year for both NMP1 and NMP2.

Inspection of the axial welds in accordance with the ASME XI code requirements will continue at NMP1 and NMP2 during the extended period of operation. Supporting analyses will be completed prior to the period of extended operation to confirm that the failure probabilities for the limiting RPV axial welds at NMP1 and NMP2 remain bounded for the period of extended operation. Based on the scoping evaluation discussed above, there is reasonable assurance the failure probability will remain acceptable for the period of extended operation. Therefore, the analysis of the axial weld failure probability has been projected in accordance with §54.21(c)(1)(ii).

Table 4.2-6
Information Required to Evaluate the Conditional Probability of Failure of the Limiting RPV Axial Welds for NMP1 and NMP2 at 64 EFPY

Unit	Weld Seam Number or Material ID	Inside Surface Fluence (n/cm^2)	RG 1.99 Fluence Factor (NOTE 1)	Chemistry (wt %)		RG 1.99 Chemistry Factor	Temperatures (°F) (NOTE 2)					Bounding Mean RT_{NDT} (NOTE 7)
				Cu	Ni		Initial RT_{NDT}	ΔRT_{NDT}	Mean RT_{NDT}	Margin	RT_{NDT} (upper bound)	
NMP1	2-564 A/C (NOTE 3)	5.51×10^{18} (NOTE 4)	0.833	0.214	0.046	97.6	-50	81.3	31.3	56	87.3	114°F
	2-564 D/F (NOTE 3)	5.51×10^{18} (NOTE 4)	0.833	0.214	0.046	97.6	-50	81.3	31.3	56	87.3	114°F
NMP2	5P5657/0931(s) (NOTE 5)	2.08×10^{18} (NOTE 6)	0.579	0.07	0.71	95.0	-60	55.0	-5.0	41.6	36.6	114°F

(NOTE 1) Determined from inside surface fluence using fluence factor equation from Section 1.1 of RG 1.99, Rev. 2.

(NOTE 2) Initial RT_{NDT} values are for specimens in the transverse orientation. Mean RT_{NDT} determined using the method of RG 1.99, Rev. 2, omitting margin term; RT_{NDT} (upper bound) determined by including margin.

(NOTE 3) Weld seam material is from weld wire heat 86054 and weld flux lot 4E5F (Table 1-1 in attachment to Reference 4.8-30). Margin term is from Table 4-4 in Attachment D to Reference 4.8-76. Copper content, nickel content, chemistry factor, and initial RT_{NDT} are values for weld wire heat 86054B from Table 1 in attachment to Reference 4.8-19.

(NOTE 4) Fluence projection at the inner surface of the weld is based on the 28 EFPY maximum fluence value (presented in Table B-4 of the attachment to Reference 4.8-25) scaled up proportionately to 64 EFPY with a 20% uncertainty factor added. As affirmed in Section 6.0 of Attachment 2 to Reference 4.8-31 (accepted by the NRC in Reference 4.8-16), this fluence projection is based on a conservative value.

(NOTE 5) Copper content, nickel content, chemistry factor, initial RT_{NDT} and margin term from Table 7-1 of the attachment to Reference 4.8-20. "(s)" indicates data were based on the single wire process.

(NOTE 6) Fluence projection at the inner surface of the weld is based on the Cycle 7 (8.72 EFPY) inner surface fluence projection (1.95×10^{17} n/cm^2, presented in Section 3.5 of the attachment to Reference 4.8-20) extrapolated to 64 EFPY using the Cycle 7 average flux value (8.78×10^8 n/cm^2-s) with a 20% uncertainty factor added.

(NOTE 7) Applicable bounding value corresponds to RPV failure frequency due to axial weld failure of 5×10^{-6} per reactor-year (Table 1 of Reference 4.8-5).

4.3 METAL FATIGUE ANALYSIS

Codes and standards used in design of nuclear power plant vessels and piping generally require some consideration of the effects of cyclic loading resulting from pressure and thermal transients. ASME Section III requires calculation of cumulative usage factors (CUFs) to demonstrate fatigue-tolerant design for reactor vessels, vessel internals, Class 1 piping and components, metal containments, and penetrations; these values are indexed to the number of transients anticipated over the design life of the component (usually 40 years). Other design codes have different requirements for fatigue analysis. For example, ASA B31.1-1955 does not require that CUFs be determined; instead, stress range reduction factors (based on the number of equivalent full temperature cycles) are used.

Designated plant events have been counted and categorized at NMPNS to ensure that the number of actual operational transient cycles does not exceed the number of transients assumed in the plant design for fatigue. This practice is very conservative because design transients are generally more severe than actual transients; thus, the actual CUFs for 40 years are usually much less than the limiting value. Pertinent data are contained in Table 4.3-1 (for NMP1) and Table 4.3-2 (for NMP2).

For certain events that affect fatigue usage, linear projections of the actual data to the end of the period of extended operation will exceed the analyzed number of design basis transients. However, because of the conservative nature of the current CUF estimates, implicit margin exists. In general, those locations whose baseline CUF for 40 years is less than 40% of the limiting value will not require additional analysis; in such cases, a margin of at least 50% can be demonstrated for 60 years of operation (i.e., 1.5 x 0.4 = 0.60, which remains below 1.0 even if increased by 50%). (A threshold value of 0.4 is conservative compared to the threshold of 0.5 used by EPRI in BWRVIP-74-A (Reference 4.8-4).

For those locations where additional fatigue analysis is required to take advantage of the implicit margin (and to more accurately determine CUFs), the EPRI FatiguePro fatigue monitoring software will be implemented at NMP1 and NMP2 prior to the period of extended operation. FatiguePro provides several options for determining the CUF. At NMPNS, the following techniques may be used for critical locations:

- Design Cycle Based Fatigue (CBF) - In this method, actual transients are paired with types of transients considered in determining the design-basis usage factor, with actual numbers of cycles substituted for assumed numbers of cycles. Each transient is assumed to be as severe as a design-basis transient. Applying the design CBF technique, in many cases, demonstrates that a baseline CUF for critical locations remains acceptable.

- Stress Based Fatigue (SBF) - A real time stress history is determined from actual temperature, pressure, and flow histories. This method provides the most refined fatigue analysis for a component. The method requires extensive and sophisticated analysis and is only employed for the highest usage locations.

Additional fatigue usage can be continuously added to the baseline CUF value for critical locations using one of the methods described above; the appropriate technique is determined on a case-by-case basis. The sections that follow discuss disposition of NMPNS fatigue analyses and related issues in detail.

Table 4.3-1
Transient Monitoring Data for NMP1

Event	Design Cycles Analyzed	Actual Transients	
		Cycles to August 2003	Percentage of Design Cycles
Vessel Head Removal	50	19	38.0%
Vessel Head Reinstallation	50	19	38.0 %
100°F/hr Heatup	240 (NOTE 1)	137	57.1 %
100°F/hr Cooldown	229 (NOTE 1)	136	59.4 %
300°F/hr Emergency Cooldown	10	0	0.0 %
Blowdown	1	0	0.0 %
Scram Cycles	280 (NOTE 1)	147	52.5 %
Emergency Condenser Initiation Into Isolated Loop (NOTE 2)	30	0	0.0 %
Unisolation of an Isolated Loop (NOTE 2)	30	0	0.0 %
Emergency Condenser Initiation Into Idle Loop (NOTE 2)	30	1	3.3 %
Shutdown Cooling Initiation Into Isolated Loop (NOTE 2)	240	0	0.0 %
Inadvertent Start of Cold Loop (NOTE 2)	20	0	0.0 %
Emergency Condenser Into Pumped Loop (NOTE 2)	500	2	0.4 %
Recirculation Pump Hot Loop Startup (NOTE 2)	300	15	5 %

(NOTE 1) Value is from Table V-2 in Reference 4.8-33.

(NOTE 2) The original NMP1 RPV Stress Analysis did not require monitoring for thermal cycles on nozzles other than the Feedwater Nozzles (considered to be the bounding location); therefore, these events (which affect the Recirculation Nozzles) were not counted/monitored until 2000. Data listed for allowable design transients are incremental values for the balance of the original license term.

Table 4.3-2
Transient Monitoring Data for NMP2

<table>
<tr><th rowspan="2">Event</th><th rowspan="2">Design Cycles Analyzed</th><th colspan="2">Actual Transients</th></tr>
<tr><th>Cycles to December 2002</th><th>Percentage of Design Cycles</th></tr>
<tr><td>Vessel Boltup</td><td>123</td><td>11</td><td>8.9 %</td></tr>
<tr><td>Vessel Unbolt</td><td>123</td><td>10</td><td>8.1 %</td></tr>
<tr><td>Vessel Hydrotest</td><td>130</td><td>20</td><td>15.4 %</td></tr>
<tr><td>Reactor Startup</td><td>120</td><td>99</td><td>82.5 %</td></tr>
<tr><td>Reactor Shutdown</td><td>111</td><td>98</td><td>88.3 %</td></tr>
<tr><td>Control Rod Sequence Exchange</td><td>400</td><td>23</td><td>5.75 %</td></tr>
<tr><td>Power Change ≥ 25%</td><td>2000</td><td>105 (NOTE 1)</td><td>1.1 %</td></tr>
<tr><td>Loss of Feedwater Heating (partial heater bypass)</td><td>70</td><td>4</td><td>5.7 %</td></tr>
<tr><td>SCRAM/Generator Trip without Loss Of Feedwater</td><td>40 (NOTE 2)</td><td rowspan="2">82</td><td rowspan="2">45.5%</td></tr>
<tr><td>Other SCRAMs</td><td>140 (NOTE 2)</td></tr>
<tr><td>SCRAM with Loss of Feedwater</td><td>10 (NOTE 2)</td><td>9</td><td>90.0 %</td></tr>
<tr><td>SCRAM with Safety or Relief Valve Actuation</td><td>8</td><td>2</td><td>25 %</td></tr>
<tr><td>SRV Discharge</td><td>5,200</td><td>189</td><td>3.6 %</td></tr>
<tr><td>LPCI or LPCS Injection</td><td>10</td><td>5</td><td>50.0 %</td></tr>
<tr><td>HPCS Injection (SCRAM with Loss of Feedwater)</td><td>30</td><td rowspan="2">10 (NOTE 3)</td><td rowspan="2">25 %</td></tr>
<tr><td>HPCS Injection without Loss of Feedwater</td><td>10</td></tr>
<tr><td>RCIC Injection (SCRAM with Loss of Feedwater)</td><td>30</td><td rowspan="2">43 (NOTE 4)</td><td rowspan="2">61.4 %</td></tr>
<tr><td>RCIC Injection without Loss Of Feedwater</td><td>40</td></tr>
</table>

(NOTE 1) Includes all power reductions greater than or equal to 25%. Previous cycle counting procedure did not discriminate between reductions greater than 25%, 50%, and 75%, although these have different numbers of design cycles.

(NOTE 2) Includes the effects of HPCS Injection (SCRAM with loss of feedwater) and RCIC Injection (Scram with Loss of Feedwater)

(NOTE 3) These events will be counted separately in the future but previously were counted together. Total design number of HPCS injections with and without loss of feedwater is 40.

(NOTE 4) These events will be counted separately going forward but previously have been counted together. Total design number of RCIC injections with and without loss of feedwater is 70.

4.3.1 REACTOR VESSEL FATIGUE ANALYSIS

Summary Description

The original design of RPV pressure boundary components included analyses of fatigue resistance. (Refer to Table V-3 in Reference 4.8-33 and Table 3.9B-2 of Reference 4.8-34.) Components were evaluated by calculating the alternating stresses associated with applicable design transients and determining a CUF based on the number of anticipated transients for the original 40-year life of the plant. Fatigue-tolerant design is demonstrated for those locations with CUFs less than 1.0. The associated analyses satisfy the criteria of §54.3(a) and are TLAAs.

Analysis

The RPV pressure boundary components for NMP1 and NMP2 were designed in accordance with ASME Boiler and Pressure Vessel Code, Section I-1962 and ASME Section III, Division I, 1971 Edition through Winter 1972 Addenda, respectively. Using methods similar or identical to those prescribed by ASME Section III, values of design CUF were computed for RPV pressure boundary components based on the number and type of design basis transients. The limiting CUF values for RPV components are listed in Table 4.3-3 (for NMP1) and Table 4.3-4 (for NMP2); all design CUFs were shown to be less than 1.0.

Disposition: §54.21(c)(1)(iii) – The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

While all design CUFs were shown to be less than 1.0, certain locations require continued monitoring (including analysis using FatiguePro as described in Section 4.3) to demonstrate compliance over the period of extended operation. Selection of critical locations was based on one or more of the following criteria:

(1) High fatigue usage (i.e., design CUF for 40 years is 0.4 or greater);

(2) Field experience suggests a fatigue concern may exist;

(3) Importance to accident scenarios (e.g., core spray nozzle); and

(4) Component identification in NUREG/CR-6260 (Reference 4.8-35) as a potential environmental fatigue concern.

Transients contributing to fatigue usage will be tracked by the NMPNS Fatigue Monitoring Program (FMP). For the critical RPV component locations, additional usage will be added to the baseline CUF using one of the methods described in Section 4.3 (CBF or SBF). Table 4.3-3 and Table 4.3-4 identify the locations to be monitored for fatigue, the monitoring method, and which criteria led to the monitoring recommendation. The FMP provides an analytical basis for confirming that the number of cycles established by the analysis of record will not be exceeded before the end of the period of extended operation (refer to Appendix B3.2). If fatigue trending of components shows that acceptable fatigue usage cannot be maintained, corrective actions such as reanalysis, enhanced inspection, or repair/replacement will be implemented. Therefore, the effects of fatigue on the intended function(s) of RPV components included in the FMP will be adequately managed in accordance with §54.21(c)(1)(iii).

NINE MILE POINT NUCLEAR STATION

Table 4.3-3
NMP1 RPV Cumulative Usage Factors

Component/Location	40-year Design CUF (NOTE 1)	Monitoring Technique	Recommendation Criteria			
			(1)	(2)	(3)	(4)
Basin Seal Skirt Weld	0.782	CBF	x			
Feedwater Nozzles (with repair cavities) (NOTE 2)	0.489	SBF	x	x		x
Recirculation Outlet Nozzles	0.065	CBF				x
Recirculation Inlet Nozzles	0.005	CBF				x
Core Spray Nozzle (low-alloy steel nozzle body)	0.003	CBF			x	x
Core Spray Nozzle Safe End (stainless steel)	0.002	CBF			x	x
Bottom Head – Vessel/Head Junction	<0.083	CBF				x

(NOTE 1) Allowable CUF is 1.0.

(NOTE 2) Fatigue of the feedwater nozzles is discussed in Section 4.3.3.

NINE MILE POINT NUCLEAR STATION

Table 4.3-4
NMP2 RPV Cumulative Usage Factors

Component/Location	40-year Design CUF (NOTE 1)	Monitoring Technique	Recommendation Criteria			
			(1)	(2)	(3)	(4)
Feedwater Nozzle – low alloy steel nozzle body (NOTE 2)	0.965	SBF	x	x		x
Feedwater Nozzle – stainless steel safe end clad (NOTE 2)	0.916	SBF	x	x		x
Closure Flange	0.954	CBF	x			
Closure Flange –studs	0.815	CBF	x			
CRD Penetration, housing (stainless steel portion)	0.942	CBF	x			
Core Spray Bracket (low alloy steel portion at vessel shell)	0.844	CBF	x			
CRD Penetration, stub tube (Inconel portion)	0.645	CBF	x			
Vessel Stabilizer Bracket	0.599	CBF	x			
Main Steam Outlet Nozzle	0.540	CBF	x			
Steam Dryer Support Bracket (low alloy steel portion at vessel shell)	0.468	CBF	x			
Steam dryer support bracket	0.679	CBF	x			
Recirculation outlet nozzle (N1) low alloy steel (nozzle @ safe end)	0.086	CBF				x
Recirculation outlet nozzle (N1) nozzle-to-shell junction	0.54	CBF	x			x
Recirculation inlet nozzle (N2) – low-alloy steel (nozzle @ safe end)	0.0235	CBF				x
Recirculation inlet nozzle (N2) – Inconel (safe end)	0.522	CBF	x			x
Core Spray Nozzle (N16) Inconel (safe end)	0.599	CBF	x		x	x
Liquid Control Nozzle – 10-inch nozzle-to-shell junction	0.564	CBF	x			
LPCI Nozzle (N6) carbon steel (pipe @ safe end)	0.742	CBF	x			
LPCI Nozzle (N6) low alloy steel (safe end @ thermal sleeve)	0.681	CBF	x			
LPCI Nozzle (N6) Inconel (safe end)	0.445	CBF	x			

(NOTE 1) Allowable CUF is 1.0.

(NOTE 2) Fatigue of the feedwater nozzles is discussed in Section 4.3.3.

4.3.2 ASME SECTION III CLASS 1 PIPING AND COMPONENTS FATIGUE ANALYSIS (NMP2 ONLY)

Summary Description

ASME Section III Class 1 piping and components were evaluated for fatigue by calculating the alternating stresses associated with applicable design transients and determining a CUF based on the number of anticipated transients for the original 40-year life of the plant. Fatigue-tolerant design is demonstrated for components with CUFs less than 1.0 (or less than 0.1 for components in break exclusion zones). Additional pipe break postulation criteria are applied to high-energy ASME Class 1 piping with a CUF greater than 0.1. The associated analyses satisfy the criteria of §54.3(a) and are TLAAs.

Analysis

Within the context of this discussion, the ASME Class 1 Piping and Components Fatigue Analysis includes piping, piping components, and Class MC penetrations (regardless of the classification of the attached piping) associated with the reactor coolant system and portions of the feedwater, main steam, reactor vessel instrumentation, reactor recirculation, residual heat removal, high and low pressure core spray (HPCS, LPCS), standby liquid control, and reactor core isolation cooling (RCIC) systems. Fatigue analysis was performed for the ASME Class 1 portions of the NMP2 piping systems, and the limiting CUF for each different segment of each piping system was computed; all design CUFs were shown to be less than the applicable limiting value.

Disposition: §54.21(c)(1)(iii) – The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

While the CUFs for all segments were shown to be less than the allowable values (generally 1.0, except in the break exclusion area where the allowable CUF is 0.1), limiting locations are subject to change; thus, ASME Class 1 piping and components require continued monitoring (including analysis using FatiguePro as described in Section 4.3) to demonstrate compliance over the period of extended operation. Selection of locations for monitoring was based on the following criteria:

(1) Highest fatigue usage component or location for each segment of each piping system (since the same transient combinations contribute equally to the fatigue usage for all components within each segment of a given piping system, the component with the highest fatigue usage bounds all other locations within that segment);

(2) Fatigue usage above a threshold value (i.e., design CUF for 40 years is greater than 0.4 (0.04 for break exclusion zone piping));

(3) Component identification in NUREG/CR-6260 (Reference 4.8-35) for the newer-vintage BWRs (i.e., locations equivalent to the recirculation suction line tee, a straight run section of the RHR line, and the limiting feedwater elbow); and

(4) High-energy ASME Class 1 piping locations outside of break exclusion zone areas that currently have a CUF above 0.1 (to determine impact on the original break postulation calculations).

Table 4.3-5 contains the current bounding locations for each ASME Class 1 piping system. For the bounding locations for ASME Class 1 systems, transients contributing to fatigue usage will be tracked by the NMPNS FMP with additional usage added to the baseline CUF using the design CBF method described in Section 4.3. The FMP provides an analytical basis for confirming that the number of cycles established by the analysis of record will not be exceeded before the end of the period of extended operation (refer to Appendix B3.2). If it is determined that CUF for a bounding location will exceed the corresponding fatigue allowable (1.0, or 0.1 in a break exclusion zone) before the end of the period of extended operation, corrective actions will be initiated, including an evaluation of the analyses for the corresponding penetrations. In addition, if a bounding location with a current CUF value less than or equal to 0.1 could have its CUF value exceed 0.1 before the end of the period of extended operation, then the impact on the original break postulation calculations will be assessed. Therefore, the effects of fatigue on the intended function(s) of ASME Class 1 piping and components included in the FMP will be adequately managed in accordance with §54.21(c)(1)(iii).

Table 4.3-5
NMP2 ASME Section III Class 1 Piping – CUF Bounding Location

System	Location	40-year Design CUF	Allowable
Main Steam Line A	Node 51	0.0898	0.1
Main Steam Drain	Node 720	0.0783	0.1
Main Steam Line C	Node 75	0.096	0.1
Main Steam System Line D	Node 51	0.0676	0.1
Feedwater – Primary Containment South Loop	Node 210	0.0823	0.1
Feedwater – Primary Containment North Loop	Node 267	0.08	0.1
Feedwater – Secondary Containment	Node 590	0.095	0.1
RCIC – Outside Primary Containment	Node 72	0.6602	1.0
HPCS	Node 65	0.7625	1.0
RWCS – Inside Primary Containment	Node 14	0.0772	0.1

4.3.3 FEEDWATER (FWS) NOZZLE AND CONTROL ROD DRIVE RETURN LINE (CRDRL) NOZZLE FATIGUE AND CRACKING ANALYSES

Summary Description

Fatigue crack initiation and growth in feedwater system (FWS) and control rod drive return line (CRDRL) nozzles have been experienced at many BWRs. Rapid thermal cycling (occurring as a result of bypass leakage past loose-fitting thermal sleeves, or in nozzles lacking thermal sleeves) initiated fatigue cracks that propagated due to larger (in terms of the magnitude of temperature and pressure change) thermal cycles resulting from plant transients. In 1980, the NRC issued NUREG-0619, *BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking*, which identified interim and long-term procedural and design changes to minimize thermal fatigue cracking, as well as inspection requirements (Reference 4.8-36).

Various calculations were prepared in response to NUREG-0619 (e.g., to support enhanced inspection intervals, to incorporate updated fatigue crack growth curves, etc.), and CUFs were determined on the basis of anticipated transients for the original 40-year life of the plant. Fatigue-tolerant design is demonstrated for those locations with CUFs less than 1.0. The associated analyses satisfy the criteria of §54.3(a) and are TLAAs.

Analysis

NMP1 FWS Nozzles

NMP1 detected significant FWS nozzle cracking in 1977. A liquid penetrant (PT) examination of one FWS nozzle performed in 1981 showed that no new cracks had initiated since the 1977 inspection and repairs. To minimize the potential for fatigue crack initiation, modifications meeting the requirements NUREG-0619 (including cladding removal, improved thermal sleeve/feedwater sparger design, rerouting of reactor water clean up piping to the feedwater line, and improved feedwater flow control; refer to Reference 4.8-37) were completed for the NMP1 FWS. A series of calculations were prepared to evaluate stress, fatigue usage, and crack growth of an assumed flaw projected to the end of life of the plant (40 years) as a function of number of operating cycles; these analyses formed the basis for the enhanced inservice inspection program for the FWS nozzle implemented at NMP1 (Reference 4.8-38). During the 1999 refueling outage (RFO15), an inservice ultrasonic examination (UT) of the four FWS nozzles discovered no reportable indications (attachment to Reference 4.8-39).

In 1999, the original stress, fatigue, and crack growth analyses were revised to meet the requirement to use the updated ASME Code fatigue curves and to incorporate changes in fatigue cycle definitions (magnitude and frequency of load cycles) based on updated plant data assumptions. These calculations include assumptions of numbers of transients occurring over a one-year period, and a determination of the low-cycle fatigue usage for the FWS nozzles. Based on an anticipated number of startup/shutdown/scram cycles per year, annual fatigue usage was calculated to be 0.003 per year.

NMP1 CRDRL Nozzle

No cracking was found during PT examinations of the NMP1 CRDRL nozzle in 1977 or during subsequent examinations. During RFO15, an inservice UT of the CRDRL nozzle discovered no reportable indications (attachment to Reference 4.8-39). A welded-in-place thermal sleeve design makes the NMP1 CRDRL nozzle less susceptible to thermal fatigue cracking than the original designs at other BWRs. In 1994, an analysis evaluating crack growth for an assumed flaw in the CRDRL nozzle showed that small surface flaws would not grow to unacceptable values within the original 40-year license period (summarized in Enclosure 4 to Reference 4.8-38).

NMP2 FWS Nozzles

The FWS nozzles at NMP2 employ the improved interference fit sparger design developed by General Electric (GE) and accepted by the NRC in Appendix C of NUREG-0619 (Reference 4.8-36). Nozzles of this design are expected to be much more resistant to fatigue than previous BWR designs.

As part of the NMP2 power uprate evaluation, the CUF for the FWS nozzle limiting location for the original 40-year license period was recalculated to the current value of 0.965 (attachment to Reference 4.8-41). The revised CUF determination incorporated evaluations of new dynamic loads and load combinations that were not included in the original design basis.

Linear projections of the number of NMP2 startup/shutdown cycles to date will exceed the assumed number of startups and shutdowns for 40 years (120 and 111, respectively) prior to the end of the current license period; this could result in exceeding the calculated FWS nozzle CUF if corrective action is not taken.

Indications not attributed to fatigue have been detected in the dissimilar metal weld associated with the NMP2 feedwater nozzles. A weld overlay process was selected as a corrective action for these indications and implemented during RFO7 on one nozzle (Reference 4.8-40). The weld overlay process both restores design margins and produces a compressive stress on the nozzle inner diameter that reduces the driving force for crack initiation and propagation. The proposed weld overlay design was submitted (Reference 4.8-78) and approved by the NRC (Reference 4.8-79). The weld overlay was designed to Code Case N-504-1, which requires that crack growth due to both the mechanism that caused the crack (assumed to be IGSCC in the design report) and fatigue be addressed. The design report for the weld overlay concluded that the probability of IGSCC growth into the overlay was minimal, and includes a calculation of fatigue crack growth based on 120 startup and shutdown cycles for the remainder of the original 40-year operating period. The calculated fatigue crack growth was 0.011 inches, which was determined to be acceptable because it is encompassed by the first 0.075 inches of weld overlay thickness which was not credited in the design. The number of startup/shutdown cycles assumed was conservative because the plant had already operated for a number of years before the repair was performed. As stated above, NMP2 will track the fatigue usage of the feedwater nozzle via the enhanced fatigue monitoring program. The effect on the weld overlay of additional startup/shutdown cycles beyond the number assumed in the original fatigue crack growth calculation will be reassessed if necessary.

NMP2 CRDRL Nozzle

In NUREG-0619 (Reference 4.8-36), the NRC evaluated a number of options proposed by GE to resolve the problem of cracking in the CRDRL nozzle and identified acceptable methods for performing the modifications. NMP2 implemented the recommendation to cut and cap the CRDRL nozzle without rerouting the CRDRL. This modification is expected to be a permanent solution to the potential issue of fatigue of the CRDRL.

Disposition: §54.21(c)(1)(iii) – The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

While their design CUFs were shown to be less than 1.0, the NMP1 and NMP2 FWS nozzles require continued monitoring (including analysis using FatiguePro as described in Section 4.3) to demonstrate compliance over the period of extended operation. Selection of these components was based on high fatigue usage (i.e., design CUF for 40 years is 0.4 or greater), past cracking experience, and identification in NUREG/CR-6260 (Reference 4.8-35) as a potential environmental fatigue concern.

Transients contributing to fatigue usage of the FWS nozzles will be tracked by the NMPNS FMP with additional usage added to the baseline CUF using the SBF method described in Section 4.3. The FMP provides an analytical basis for confirming that the number of cycles established by the analysis of record will not be exceeded before the end of the period of extended operation (refer to Appendix B3.2). If fatigue trending of the FWS nozzles shows that acceptable fatigue usage cannot be maintained, corrective actions such as reanalysis, enhanced inspection, or repair/replacement will be implemented.

Additionally, the NMP1 FWS nozzles will be periodically inspected in accordance with NMP1 commitments related to NUREG-0619 (refer to Appendix B2.1.5).

As indicated above, there are no fatigue concerns associated with the CRDRL nozzle at NMP2. The fatigue usage of the NMP1 CRDRL nozzle has been calculated to be significantly below the allowable fatigue usage of 1.0 over the life of the plant, including a 20-year license extension. However, NMP1 will continue to perform enhanced inspections of the CRDRL nozzle in accordance with NMP1 commitments related to NUREG-0619.

Therefore, the effects of fatigue on the intended function(s) of the FWS and CRDRL nozzles will be adequately managed in accordance with §54.21(c)(1)(iii).

4.3.4 NON-ASME SECTION III CLASS 1 PIPING AND COMPONENTS FATIGUE ANALYSIS

Summary Description

With the exception of the RCPB piping at NMP2 (discussed in Section 4.3.2), piping and components within the scope of license renewal at NMPNS were designed to codes other than ASME Section III Class 1; applicable codes include ASA B31.1-1955 and ASME Section III Class 2 or 3. (Refer to Section I.A.1.0 of Reference 4.8-33 and Section 3.9 of Reference 4.8-34.) These codes do not require explicit fatigue analysis; instead, the effects of cyclic loading are accounted for through application of stress range reduction factors based on the anticipated number of equivalent full temperature thermal expansion cycles over the original 40-year life of the plant. Application of the appropriate stress range reduction factor satisfies the criteria of §54.3(a); as such, this analysis is a TLAA.

Analysis

Within the context of this discussion, the Non-ASME Class 1 Piping and Components Fatigue Analysis includes piping systems and associated components in the scope of license renewal that are generally outside the containment isolation valves (i.e., not part of the RCPB); however, since no piping at NMP1 was originally designed to ASME Section III Class 1, this analysis also applies to the NMP1 RCPB. For these systems, no explicit fatigue analysis was required by the original design codes. Since the anticipated number of stress cycles is 7000 or less for the 40-year life of these components, the applicable stress range reduction factor is 1.0; this results in no reduction of the allowable stress range.

Disposition: §54.21(c)(1)(iii) – The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

The original design for cyclic loading is expected to remain valid for the period of extended operation for the majority of Non-ASME Class 1 systems and components. However, the original method of addressing fatigue design may be nonconservative for certain locations at NMP1; thus, some Non-ASME Class 1 locations require development of fatigue analyses (similar to those performed for ASME Class 1 piping) to provide evidence that all requirements specified in the CLB are maintained. These locations include those meeting one or more of the following criteria:

(1) The location experiences high fatigue usage due to significant thermal transients due primarily to on/off flow, stratification, and local thermal cycling effects;

(2) The location experiences high fatigue usage due to structural or material discontinuities that result in high stress indices (e.g., at thickness transitions); and

(3) The location has been identified in NUREG/CR-6260 (Reference 4.8-35) for the older-vintage BWRs (i.e., locations equivalent to the recirculation line at the RHR return line tee, the RHR line at the tapered transition, and the feedwater line at the RCIC tee).

Based on the above criteria, portions of the following NMP1 systems were identified for further analysis:

- Feedwater/High Pressure Coolant Injection System,
- Core Spray System,
- Reactor Water Cleanup (RWCU) System (piping inside the RCPB), and
- Reactor Recirculation System (and associated Shutdown Cooling System lines).

Prior to the period of extended operation, a baseline CUF (based on a conservative analysis of the fatigue usage to-date) will be determined for the specified portions of the NMP1 systems listed above. If the baseline CUF for a specified portion of a system exceeds 0.4 (considered a general threshold of significance), the limiting location may require monitoring to demonstrate compliance over the period of extended operation. Non-ASME Class 1 piping systems at NMP1 are affected by a subset of the transients listed in Table 4.3-1. For the limiting locations, those transients contributing to fatigue usage will be tracked by the NMPNS FMP with additional usage added to the baseline CUF using the design CBF method described in Section 4.3. The FMP provides an analytical basis for confirming that the number of cycles established by the analysis of record will not be exceeded before the end of the period of extended operation (refer to Appendix B3.2). If it is determined that CUF for a limiting location will exceed 1.0 before the end of the period of extended operation, corrective actions will be initiated.

Based on the criteria listed above, no locations in the Non-ASME Class 1 piping at NMP2 are expected to require development of fatigue analyses. ASME Section III Class 2 and 3 piping generally experiences less severe thermal transients and does not include any of the locations identified in NUREG/CR-6260. Therefore, the existing fatigue design basis for NMP2 is considered valid for the period of extended operation. If fatigue monitoring of ASME Class 1 piping at NMP2 (described in Section 4.3.2) indicates higher fatigue usage than expected, Non-ASME Class 1 piping will be evaluated for possible fatigue concerns.

Therefore, the effects of fatigue on the intended function(s) of Non-ASME Class 1 piping and components included in the FMP will be adequately managed in accordance with §54.21(c)(1)(iii).

4.3.5 REACTOR VESSEL INTERNALS FATIGUE ANALYSIS

Summary Description

Determination of CUFs was not a design requirement for reactor vessel internals at NMPNS. (Refer to Section IV.B.7.0 of Reference 4.8-33 and Section 3.9B of Reference 4.8-34.) However, the mechanical clamps installed as a repair for the NMP1 cracked vertical core shroud welds and certain locations in the NMP2 reactor vessel internals were evaluated for fatigue using ASME Section III methods to calculate alternating stresses and determine CUF values based on a number of anticipated transients (generally, for the original 40-year life of the plant). Fatigue-tolerant design is demonstrated for those locations with CUFs less than 1.0. The associated analyses satisfy the criteria of §54.3(a) and are TLAAs.

Analysis

Studies commissioned by the BWR Vessel and Internals Project (BWRVIP) have concluded that thermal fatigue is not a failure mode of concern for any safety-related reactor internal components. However, fatigue analyses are part of the CLB for the components listed in Table 4.3-6; all design CUFs were shown to be less than 1.0.

NMP1 and NMP2 have implemented all relevant BWRVIP-required inspections as augmented inservice inspections in accordance with applicable ASME Code requirements. Due to concerns over fatigue caused by flow-induced vibration, additional BWRVIP recommendations for inspection of the jet pump riser brace to detect fatigue cracking are being followed at NMP2.

Disposition: §54.21(c)(1)(iii) – The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

While all CUFs determined for components comprising the reactor vessel internals are less than 1.0, the calculated values for certain locations exceed 0.4 (considered a general threshold of significance); thus, the CUFs for these locations (i.e., the shroud, core support plate and studs, and jet pumps at NMP2) will be revised or reevaluated to remove conservatism and/or encompass the period of extended operation. In particular, a more extensive fatigue analysis of the NMP2 jet pumps (whose original design analyses are proprietary to GE) will be performed prior to the period of extended operation. If the revised analyses indicate the fatigue usage is still a concern for these locations, additional corrective actions will be taken (including evaluation of the corresponding locations in NMP1 to address the potential for significant fatigue usage).

The potential for cracking of components comprising the reactor vessel internals, both due to fatigue and (more significantly) intergranular stress corrosion cracking (IGSCC), is managed by the BWR Vessel Internals Program at NMPNS, which incorporates comprehensive inspection and evaluation guidelines issued by the BWRVIP and approved by the NRC (refer to Appendix B2.1.8). These activities provide assurance that any unexpected degradation resulting from fatigue in the reactor vessel internals for the current license period and the period of extended operation will be identified and corrected; therefore, the effects of fatigue on the intended function(s) of the reactor vessel internals will be adequately managed for the period of extended operation in accordance with §54.21(c)(1)(iii).

Table 4.3-6
Reactor Vessel Internals Cumulative Usage Factors

Unit	Internal Component	40-year Design CUF
NMP1	Core Shroud Vertical Weld Repair Clamps (limiting location)	0.0341 (NOTE 1)
	Core Shroud Stabilizer Tie-Rod Assemblies	(NOTE 2)
NMP2 (NOTE 3)	Core Spray Sparger	0.2
	Shroud	0.43
	Shroud Head Assembly	0.049
	Core Support Plate & Stud	0.93
	Top Guide	0.169
	Control Rod Drive	0.093
	Jet Pump and Jet Pump Riser Brace	0.67 (NOTE 4)
	Core Diff. Pressure and Liquid Control Line	0.02
	Orificed Fuel Support	0.047

(NOTE 1) Mechanical clamps were installed as a repair for cracked vertical shroud welds. The repair clamp assemblies were designed to meet the requirements of ASME Section III Subsection NG; CUFs due to thermal expansion (including 120 startup/shutdown cycles and 30 loss of feedwater cycles) were determined (Table 15 in Enclosure 2 to Reference 4.8-42).

(NOTE 2) Tie-rod assemblies were installed as a structural replacement for cracked horizontal shroud welds. The effect of this repair on the fatigue usage of the reactor vessel and internals at the load transfer points was evaluated as part of the tie-rod design analysis and found to be negligible (Enclosure 2 to Reference 4.8-43). In addition, the CUF due to cyclic stresses caused by vibration was determined to be less than 1.0 for the 25-year design life of the repair hardware (Enclosure 1 to Reference 4.8-43). Evaluation of subsequent modifications to the tie-rod assemblies in 1997 (Reference 4.8-75) and 1999 (Enclosure 3 to Reference 4.8-44) did not change these conclusions regarding fatigue.

(NOTE 3) CUFs for NMP2 reactor vessel internals are based on mechanical fatigue due to flow-induced vibrations and non-thermal dynamic loads rather than thermal fatigue, and may be based on very conservative assumptions.

(NOTE 4) The limiting location for jet pump fatigue for the current license period is the riser brace.

4.3.6 ENVIRONMENTALLY ASSISTED FATIGUE

Summary Description

Generic Safety Issue (GSI) 190, *Fatigue Evaluation of Metal Components for 60-year Plant Life*, was established to address NRC concerns regarding environmental effects on fatigue of pressure boundary components for 60 years of plant operation. The NRC staff studied the probability of fatigue failure for selected metal components based on the increased CUFs determined in NUREG/CR-6260 (Reference 4.8-35) and a 60-year plant life. The NRC closed this GSI, and concluded that environmental effects did not substantially affect core damage frequency. However, since the nature of age-related degradation indicated the potential for an increase in the frequency of pipe leaks as plants continue to operate, licensees are required to address the effects of coolant environment on component fatigue life as aging management programs are formulated in support of license renewal (Reference 4.8-45). The consideration of environmental effects as part of fatigue calculations satisfies the criteria of §54.3(a); as such, this analysis is a TLAA.

Analysis

As indicated in Section 4.3.1 (for RPV components), Section 4.3.2 (for NMP2 RCPB piping systems), Section 4.3.3 (for FWS nozzles), and Section 4.3.4 (for NMP1 RCPB piping systems), locations equivalent to those identified in Reference 4.8-35 have been designed to account for the effects of cyclic loading. For those locations where the original design codes required explicit fatigue analysis, all design CUFs were shown to be less than 1.0.

Disposition: §54.21(c)(1)(iii) – The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

NMP1 and NMP2 will assess the impact of the reactor coolant environment on a sample of critical component locations, including locations equivalent to those identified in NUREG/CR-6260 (Reference 4.8-35), as part of the NMPNS FMP (refer to Appendix B3.2). These locations will be evaluated by applying environmental correction factors (F_{en}) to existing and future fatigue analyses. Evaluation of the sample of critical components will be completed prior to the period of extended operation.

Therefore, the effects of environmentally assisted fatigue will be adequately managed for the period of extended operation in accordance with §54.21(c)(1)(iii).

4.3.7 FATIGUE OF THE EMERGENCY CONDENSER (NMP1 ONLY)

Summary Description

The Emergency Cooling System (ECS) provides for decay heat removal from the reactor fuel in the event that reactor feedwater capability is lost and the main condenser is not available. The tube and shell sides of the emergency condensers were designed in accordance with ASME Section III Class 2 and 3, respectively. (Refer to Section V.E.1.0 of Reference 4.8-33.) In 1997, failures of the original tubing were attributed to thermal fatigue resulting from leakage past the condensate return valve to the RPV (enclosure to Reference 4.8-49). As part of the subsequent modification and repair, fatigue loading was evaluated by calculating the alternating stresses associated with applicable design transients and determining a CUF based on the number of anticipated transients for the life of the condensers. Fatigue-tolerant design is demonstrated for components with CUFs less than 1.0. The calculation satisfies the criteria of §54.3(a); as such, this analysis is a TLAA.

Analysis

Components that were not designed in accordance with ASME Section III Class 1 have historically had no requirement to track transients leading to fatigue cycles. However, the NMP1 ECS condensate return lines were identified as potentially susceptible to the thermal cycling fatigue phenomena described in NRC Bulletin 88-08, and monitoring of temperatures in the unisolable portions of the ECS is performed (Reference 4.8-50). Detailed analysis was performed to demonstrate the fatigue resistance of the tube bundles for the modified emergency condensers; all design CUFs were shown to be less than 1.0.

Disposition: §54.21(c)(1)(iii) – The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

While all CUFs were shown to be less than 1.0, certain locations in the NMP1 emergency condensers require continued monitoring (including analysis using FatiguePro as described in Section 4.3) to demonstrate compliance over the period of extended operation. The limiting (i.e., highest fatigue usage) components for each analyzed portion of the condenser were selected, as well as any component with design CUF greater than 0.4 (considered a general threshold of significance). Table 4.3-7 contains a tabulation of the monitored locations in the emergency condensers. The NMPNS FMP will track transients specific to the ECS with additional usage added to the baseline CUF for the condensers as described in Section 4.3. The FMP provides an analytical basis for confirming that the number of cycles established by the analysis of record will not be exceeded before the end of the period of extended operation (refer to Appendix B3.2). If it is determined that CUF for a limiting location will exceed 1.0 before the end of the period of extended operation, corrective actions will be initiated. Therefore, the effects of fatigue on the intended function(s) of the NMP1 emergency condensers will be adequately managed in accordance with §54.21(c)(1)(iii).

Table 4.3-7
NMP1 Emergency Condenser Fatigue Usage

Location Description	40-year Fatigue Usage
Tubing	0.625
Tubesheet	0.595
Nozzle Junction	0.581
Tube-to-tubesheet weld	0.714

4.4 ENVIRONMENTAL QUALIFICATION (EQ)

4.4.1 ELECTRICAL EQUIPMENT EQ

Summary Description

10 CFR 50.49 requires that certain safety related and non-safety related electrical equipment remain functional during and after identified Design Basis Events. To establish reasonable assurance that this equipment can function when exposed to postulated harsh environmental conditions, licensees are required to determine the equipment's qualified life and to develop a program that maintains the qualification of that equipment.

Determination of qualified life is an ongoing activity that considers both normal and accident operating environments. Aging evaluations that specify a qualified life of at least 40 years satisfy the criteria of §54.3(a). Thus, any such analysis is a TLAA.

Analysis

The NMPNS EQ Program has been established to designate equipment, demonstrate qualification, and ensure that correct preventive and corrective maintenance activities are conducted to maintain equipment qualification (refer to Appendix B3.1). When required by ongoing analyses of updated or revised test data, accident profiles, or normal operating environments, re-evaluation of qualified life determinations are conducted in accordance with EQ Program requirements.

The EQ Program established the qualification status of all equipment falling under the scope of §50.49 for the current operating terms of NMP1 (Reference 4.8-51) and NMP2 (Reference 4.8-52 and Reference 4.8-53). Based on their reviews of program scope and the methods used to determine qualification, the NRC staff concluded that NMP1 (Reference 4.8-54) and NMP2 (Reference 4.8-55) comply with the applicable regulations and standards for EQ as detailed in §50.49.

Disposition: §54.21(c)(1)(iii) – The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

For components within the scope of the NMPNS EQ Program, analyses of thermal exposure, radiation exposure, and mechanical cycle aging that cannot be shown to remain valid for the period of extended operation will be projected to extend the qualification of components before reaching the aging limits established in the applicable evaluation, or the components will be refurbished or replaced. Therefore, the effects of aging on components included in the EQ Program will be adequately managed in accordance with §54.21(c)(1)(iii).

4.4.2 MECHANICAL EQUIPMENT EQ (NMP2 ONLY)

Summary Description

To demonstrate compliance with General Design Criterion 4 of Appendix A to 10 CFR 50, the NRC staff required that NMP2 submit evaluations of the environmental effects on nonmetallic subcomponents comprising safety related mechanical equipment that must remain functional in harsh environments during and after identified Design Basis Events (Reference 4.8-56). Threshold radiation values and maximum service temperatures for these materials were compared with the maximum postulated environmental conditions to establish qualification; if necessary, a material replacement life limit was calculated.

Determination of qualified life considered both normal and accident operating environments. Aging evaluations that specify a qualified life of at least 40 years satisfy the criteria of §54.3(a). Thus, any such analysis is a TLAA.

Analysis

The NMPNS EQ Program has been established to designate equipment, demonstrate qualification, and ensure that correct preventive and corrective maintenance activities are conducted to maintain equipment qualification (refer to Appendix B3.1). When required by ongoing analyses of updated or revised test data, accident profiles, or normal operating environments, re-evaluation of qualified life determinations are conducted in accordance with EQ Program requirements.

The EQ Program provides a documented analysis of the nonmetallic materials used in safety-related mechanical equipment, and demonstrates that the cumulative environmental effects of plant operation for the current operating term of NMP2 and postulated accidents would not degrade these materials in such a way as to prevent the performance of required safety functions (Section 4.1.3 of attachment to Reference 4.8-58). Based on their reviews of program scope and the methods used to determine qualification, the NRC staff concluded that NMP2 complies with the applicable regulations and standards for EQ of safety-related mechanical equipment (Reference 4.8-55).

Disposition: §54.21(c)(1)(iii) – The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

For components within the scope of the NMPNS EQ Program, analyses of thermal exposure, radiation exposure, and mechanical cycle aging that cannot be shown to remain valid for the period of extended operation will be projected to extend the qualification of the components before reaching the aging limits established in the applicable evaluation, or the components will be refurbished or replaced. Therefore, the effects of aging on components included in the EQ Program will be adequately managed in accordance with §54.21(c)(1)(iii).

4.5 CONCRETE CONTAINMENT TENDON PRESTRESS ANALYSIS

The NMP1 and NMP2 containments do not employ prestressed concrete designs; therefore, this TLAA is not applicable to NMPNS.

4.6 CONTAINMENT LINER PLATE, METAL CONTAINMENTS, AND PENETRATIONS FATIGUE ANALYSIS

4.6.1 TORUS SHELL AND VENT SYSTEM FATIGUE ANALYSIS (NMP1 ONLY)

Summary Description

Large-scale testing of the Mark III containment and in-plant testing of Mark I primary containment systems identified additional hydrodynamic loads that were not considered in the original design of the Mark I containment used at NMP1. To provide the bases for generic load definition and structural assessment techniques, GE initiated the Mark I Containment Program. In 1980, the NRC issued NUREG-0661, *Safety Evaluation Report, Mark I Containment Long Term Program*, *Resolution of Generic Technical Activity A*-7, which required a plant-unique analysis for each Mark I configuration to evaluate the effects of the hydrodynamic stresses resulting from a loss of coolant accident (LOCA) and safety relief valve (SRV) discharge (Reference 4.8-59).

Various calculations were prepared in response to NUREG-0661 and supplemental NRC guidance, and CUFs were determined on the basis of anticipated transients for the original 40-year life of the plant. Fatigue-tolerant design is demonstrated for those locations with CUFs less than 1.0. The associated analyses satisfy the criteria of §54.3(a) and are TLAAs.

Analysis

The Mark I Containment Program plant-unique analysis report (PUAR) for the NMP1 suppression chamber (torus) (attachment to Reference 4.8-60) summarized fatigue analyses for the torus shell and external support system and the vent header system. Evaluations were performed in accordance with ASME Section III, Division 1 (with addenda through Summer 1977) and Code Case N-197; with application of additional hydrodynamic loads, all design CUFs were shown to be less than 1.0.

The PUAR for the NMP1 suppression chamber (torus) also documented analyses of stresses due to hydrodynamic loads for internal structures (e.g., ring girder, SRV Y-quencher, and vent line bellows). Since peak stresses are far below the allowable values for these locations, no fatigue analyses were reported. Thus, no TLAAs are identified for these components.

Disposition: §54.21(c)(1)(i) – The analyses remain valid for the period of extended operation;
AND
§54.21(c)(1)(ii) – The analyses have been projected to the end of the period of extended operation.

The design basis accident (DBA) was identified as the major load contributing to the fatigue evaluation for all high stress locations in the vent header system. The controlling usage factor was 0.76 at the vent header support. Provided that a DBA (the major contributor to fatigue) does not occur during the original 40-year license period, this usage factor will not be exceeded during the period of extended operation; therefore, the NMP1 vent header fatigue usage analyses remain valid in accordance with §54.21(c)(1)(i).

Table 4.6-1 contains CUFs for the peak stress locations in the torus shell; the 60-year CUF values for all controlling locations are less than 1.0. Therefore, CUF for the NMP1 torus shell has been projected for the period of extended operation in accordance with §54.21(c)(1)(ii).

Table 4.6-1
Cumulative Usage Factors for NMP1 Torus Shell

Description	40-year CUF			60-year CUF (NOTE 3)
	Normal Operations	SBA/IBA (NOTE 1)	DBA (NOTE 2)	
Element 17	.003	.001	.008	.0135
Element 165	.018	.002	.034	.063

(NOTE 1) Small-break accident/Intermediate-break accident (Reference 4.8-59)

(NOTE 2) The DBA CUF is assumed to exclude normal operation.

(NOTE 3) The 60-year CUF is obtained by multiplying the normal operations CUF by 1.5 and adding the sum of CUF values for one SBA/IBA and one DBA.

4.6.2 TORUS ATTACHED PIPING ANALYSIS (NMP1 ONLY)

Summary Description

As a result of the Mark I Containment Program, many modifications were performed at NMP1, including changes to the configuration of SRV piping and other piping penetrating the suppression chamber (torus) (generically referred to herein as torus-attached piping). Refer to Section VI.A.3.0 of Reference 4.8-33. As part of the generic Mark I Containment Program, fatigue analyses were performed considering the design loads identified in NUREG-0661 and its supplements, which determined CUFs based on the number of anticipated transients for the original 40-year life of the plant. Fatigue-tolerant design is demonstrated for those locations with CUFs less than 1.0. The associated analyses satisfy the criteria of §54.3(a) and are TLAAs.

Analysis

The Mark I Containment Program PUAR for NMP1 torus-attached piping (attachment to Reference 4.8-61) presented the results of piping analyses performed in accordance with ASME Section III, Division 1 (with addenda through Summer 1977) for the six SRV lines and all other torus-attached piping (comprising piping segments from six separate systems connecting through 36 separate penetrations). The report states that fatigue loading of the SRV and torus-attached piping and penetrations at NMP1 is bounded by the conclusions of analyses presented in MPR-751, *Mark I Containment Program – Augmented Class 2/3 Fatigue Evaluation Method and Results for Typical Torus Attached and SRV Piping Systems*. The NRC reviewed the industry report and determined its conclusion (i.e., that all torus piping systems have a CUF of less than 0.5 during the plant life) was acceptable for NMP1 (Enclosure 2 to Reference 4.8-62).

The PUAR for the NMP1 torus-attached piping also addressed torus-to-drywell vacuum breaker piping (which was not part of the Mark I Containment Program), and determined that it would not be subject to significant fatigue cycling. Thus, no TLAA is identified for this piping.

Disposition: §54.21(c)(1)(ii) – The analyses have been projected to the end of the period of extended operation.

Since the bounding 40-year CUFs for the subject piping and associated penetrations are less than 0.5, the 60-year CUF values for all controlling locations can be demonstrated to remain less than 1.0. Therefore, the torus-attached piping analysis has been projected for the period of extended operation in accordance with §54.21(c)(1)(ii).

4.6.3 TORUS WALL THICKNESS (NMP1 ONLY)

Summary Description

The NMP1 suppression chamber (torus) is constructed of A201 Grade B (Firebox) steel plates with a certified minimum thickness of 0.460 inches. This value included an original corrosion allowance of 0.0625 inches, which was added to the minimum wall thickness required by the applicable design codes (Section IV-B.2.4 of Reference 4.8-33). However, subsequent addition of hydrodynamic loads (resulting from LOCA and SRV actuation) to the containment design bases resulted in a reduction of the corrosion allowance. To establish reasonable assurance that the revised minimum wall thickness of 0.431 inches is not reached, NMP1 is required to monitor torus wall thickness and corrosion rate (Reference 4.8-63). Determination of torus corrosion rates is an ongoing activity that considers inspection results and the remaining corrosion allowance. Evaluation of the approach to minimum wall thickness satisfies the criteria of §54.3(a). Thus, any such analysis is a TLAA.

Analysis

The NMP1 Torus Corrosion Monitoring Program has been developed to monitor the torus shell material thickness and ensure it is maintained within the bounds of the qualification bases (refer to Appendix B3.3). Assessment of observed torus shell conditions ensures that timely action can be taken to correct degradation that could lead to loss of the intended function.

In Attachment 1 to Reference 4.8-64, NMP1 identified the controlling stresses for the torus shell and a method for computing corrosion allowances based on the reduced stress values. Based on their review of the information provided by NMP1, the NRC staff concluded that (1) the method for calculation is acceptable; and (2) with implementation of the prescribed monitoring program, the torus shell meets ASME Code requirements provided that the average minimum wall thickness is not reduced to less than 0.431 inches (Reference 4.8-63).

Disposition: §54.21(c)(1)(iii) – The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

The NMP1 Torus Corrosion Monitoring Program assures that NMP1 torus shell thickness will not be reduced to less than the minimum required value in any future operation. Therefore, the effects of loss of material on the intended function(s) of the torus shell will be adequately managed in accordance with §54.21(c)(1)(iii).

4.6.4 CONTAINMENT LINER ANALYSIS (NMP2 ONLY)

Summary Description

The NMP2 Mark II containment is a reinforced concrete structure consisting of a drywell chamber located above a suppression chamber, with a drywell floor separating the two. Except at various penetrations and access openings through the walls, the primary containment liner is a continuous steel membrane (attached to the inside face of the wall) that functions as a leak-tight barrier to the release of fission products. The containment wall is designed to withstand anticipated loads without participation of the liner as a structural component. The portion of the liner functioning as the suppression pool floor is welded to the wall liner through a corner junction embedment. (Refer to Section 3.8.1.1 of Reference 4.8-34.)

The fatigue analysis for the NMP2 containment liner, in accordance with requirements specified in ASME Section III, was conducted assuming a 40-year life. Fatigue-tolerant design is demonstrated for those locations with CUFs less than 1.0. The associated analyses satisfy the criteria of §54.3(a) and are TLAAs.

Analysis

The wall liner, floor liner plate, and corner transition section are designed for the loads and load combinations described in Table 3.8-2 of Reference 4.8-34 so that either (1) the resulting stress levels do not exceed the allowable limits given in ASME Section III, Division 1, Subsection NE (1971 Edition through 1973 Summer Addenda), or (2) the resulting strain levels do not exceed the allowable strain levels given in ASME Section III, Division 2, Subsection CC-3700 (1975 Edition). (Refer to Section 3.8.1.3.2 of Reference 4.8-34.)

The liner was analyzed using the computer program KALNINS; the outer edge of the suppression pool floor liner plate and the corner transition section are analyzed using the computer code SHELL 1 for thin shells of revolution. The current analysis demonstrates that the CUF is below 1.0 for all locations (Section 3.8.1.4.2 of Reference 4.8-34).

The liner structural integrity against buckling is obtained from the results of an analysis performed using the ANSYS computer program. Results show that the anchor studs have a safety factor of at least 2.0 against progressive failure (Section 3.8.1.4.2 of Reference 4.8-34).

Disposition: §54.21(c)(1)(ii) – The analyses have been projected to the end of the period of extended operation.

The CUF calculations for the NMP2 containment liner will be reevaluated based on an increased number of assumed cyclic loads prior to the end of the period of extended operation. All cyclic loads considered in the original fatigue analyses, including hydrodynamic loads and loads resulting from Type A leak rate tests, will be reevaluated and revised as necessary. The analysis will also evaluate the potential for additional fatigue for subcomponents of the containment liner, including the heads of various hatches, airlock bulkheads, and the drywell head. The revised analysis will demonstrate that the 60-year CUF values for all controlling locations remain less than 1.0; therefore, the containment liner analysis has been projected for the period of extended operation in accordance with §54.21(c)(1)(ii).

4.7 OTHER PLANT-SPECIFIC TLAAS

4.7.1 RPV BIOLOGICAL SHIELD (NMP2 ONLY)

Summary Description

A biological shield wall (BSW) with an inner radius of 14 feet, ¾ inch and an outer radius of 15 feet, 9-¼ inch surrounds the NMP2 RPV. The BSW consists of two concentric 1-½ inch thick steel cylinders connected by internal horizontal and vertical stiffeners. Full penetration welds connect the plates that make up the cylinders. The space between the steel cylinders is filled with nonstructural heavy-density fill material for radiation shielding. (Refer to Section 3.8.3.1.3 of Reference 4.8-34.)

Discovery of weld defects during fabrication of the BSW resulted in stress and fracture mechanics analyses to determine an acceptable flaw size; the results showed the majority of the flaws were acceptable, while a small number of flaws required repair (Tables 1, 2, and 3 in enclosure to Reference 4.8-65). A related calculation was prepared to estimate the amount of neutron irradiation embrittlement (in terms of the 30 ft-lb transition temperature shift) of the BSW structural steel at the end of a 40-year life. Since this calculation confirmed the validity of the BSW fracture mechanics analyses for the current license term, it satisfies the criteria of §54.3(a). As such, this analysis is a TLAA.

Analysis

A threshold fluence value was determined below which the transition temperature shift would be zero. The 40-year neutron fluence at the BSW inside surface was determined to be less than the threshold value; therefore, the conclusion of the subject calculation states that no neutron embrittlement of the structural steel would occur during the 40-year life of the plant.

The original fracture mechanics analysis specified that the stress intensity factor (K_I) be less than a dynamic fracture toughness (K_{Id}) of 48.8 ksi$(in)^{0.5}$, based on a Charpy V-notch energy (C_v) of 20 ft-lbs at 100°F. This value was applied as an acceptance criterion for flaws in the base metal. Measured C_v values showed that the K_{Id} values used for the weld metal and heat affected zone in the original calculation both had higher fracture toughness than the base metal. Since the shift in the C_v values for the weld and heat affected zone was expected to be no greater than that predicted for the base metal, the base metal toughness was considered bounding for this evaluation (Section IV.B.2 in enclosure to Reference 4.8-65).

The NRC reviewed the repairs to the BSW welds and the associated fracture mechanics evaluations, and concluded that all BSW welds were acceptable for the intended service (Section 2.2 in Enclosure to Reference 4.8-66).

Disposition: §54.21(c)(1)(ii) – The analyses have been projected to the end of the period of extended operation.

At the BSW outer wall, neutron fluence is negligible due to attenuation through the heavy-density fill material; therefore, the fracture toughness properties of the outer wall plates and welds will be unaffected.

The neutron fluence at the surface of the BSW inner wall has been projected through the period of extended operation. For E>1.0 MeV, the most recent RPV surveillance report (the attachment to Reference 4.8-20) documents a projected peak fluence at the RPV inner radius of 1.95×10^{17} n/cm^2 at 8.72 EFPY, with an average flux value of 8.78×10^{8} n/cm^2-s at the same location. This flux value can be used to extrapolate the fluence for an additional 45.28 EFPY exposure, yielding a fluence value of 1.45×10^{18} n/cm^2 at 54 EFPY. A conservative value of the corresponding fluence at the RPV outer radius is predicted by multiplying the inner surface fluence value by the exponential attenuation factor ($e^{-0.24\,x}$) presented in RG 1.99 (Reference 4.8-10), where x is the thickness of the RPV wall (6.4375 inches, determined from Table 3-2 in the attachment to Reference 4.8-20). The neutron flux with E>1.0 MeV falls off by approximately 18% in the void between the exterior surface of the RPV and the BSW inside surface; thus, a 54 EFPY fluence of 2.54×10^{17} n/cm^2 is projected at the surface of the inner steel cylinder of the BSW.

More recent data for irradiation of structural steels at low temperatures enables a more accurate estimation of embrittlement for the BSW. Materials from the Shippingport Reactor neutron shield tank and the High Flux Isotope Reactor vessel were irradiated to 5.07×10^{17} n/cm^2 (E>1.0 MeV) in a test reactor at a controlled temperature of 130°F to approximate the normal service temperatures of the structures. The results indicated a maximum elevation in 30 ft-lb transition temperature of 35°F and a reduction in USE of less than 6 ft-lb (Reference 4.8-67). Since the projected fluence for the NMP2 BSW is less than the value reported in Reference 4.8-67, the shift in C_v due to irradiation is also reduced. Reduction in material properties due to irradiation has been shown to be proportional to the square root of fluence for low fluence irradiation; thus, the reduction in C_v energy at 100°F was determined by multiplying the 30 ft-lb temperature shift at 5.07×10^{17} n/cm^2 (reported in Reference 4.8-67) by the ratio of the square roots of the projected fluence at the BSW inner wall and the reference fluence (5.07×10^{17} n/cm^2). This results in a revised C_v for the BSW steel of 9.62 ft-lbs at 100°F, and K_{Id} of 37.1 ksi(in)$^{0.5}$.

A review of Tables 1, 2, and 3 in the enclosure to Reference 4.8-65 shows that no indications with applied K_I greater than or equal to the projected K_{Id} were allowed to remain in service without repair. Based on projected fluence value, the USE of the BSW material is reduced but does not invalidate the original fracture mechanics analyses. Therefore, fracture toughness of the NMP2 BSW has been projected (reevaluated) for the period of extended operation in accordance with §54.21(c)(1)(ii).

4.7.2 MAIN STEAM ISOLATION VALVE CORROSION ALLOWANCE (NMP2 ONLY)

Summary Description

The Main Steam Isolation Valve (MSIV) bodies were fabricated from low-alloy steel, and are exposed to a dry steam environment during plant operation. During a refueling outage, the MSIVs are exposed to treated water and air. To provide for 40-year service in these environments, Section 5.4.5 of Reference 4.8-34 indicates a 0.120-inch corrosion allowance was added to the MSIV wall thickness in addition to the minimum required by applicable codes.

The calculation that determined this corrosion allowance satisfies the criteria of §54.3(a). As such, this analysis is a TLAA.

Analysis

Since the predicted rates of flow-accelerated corrosion (FAC) and general corrosion in dry steam are typically negligible for low-alloy steel, the FAC Program (described in Appendix B2.1.9) does not specify wall thickness measurements for the MSIV bodies at NMP2.

During RPV flood-up at the start of a refueling outage, the MSIVs are flooded with treated water. Plugs are installed in the main steam outlet nozzles during the flooding of the RPV for refueling operations to allow draining of the lines for other maintenance activities. During the remainder of the refueling outage, the MSIV bodies are exposed to an air environment. The total duration of exposure to treated water is typically 3-4 days per refueling outage; the main steam lines are not flooded during non-refueling outages.

The NRC staff reviewed and accepted the design of the main steam isolation system, including the NMP2 MSIVs, in the applicable SERs (Reference 4.8-68 and Reference 4.8-69).

Disposition: §54.21(c)(1)(i) – The analyses remain valid for the period of extended operation.

The expected reduction in MSIV wall thickness due to FAC and general corrosion is calculated based on projected exposure of the valve bodies to each of the three environments described above.

Conservatively doubling the expected 4-day duration per refueling outage, the period of treated water exposure would be 8 days every two years over 60 years; thus, the cumulative exposure to a treated water environment is projected to be 240 days (0.66 years) over a 60-year lifetime. While exposed to the oxygenated, low-temperature treated water environment, a very conservative corrosion rate of 5 mils per year is assumed (from Figure 87, p. 978 of Reference 4.8-70; appropriate for oxygenated seawater, which would have a much higher corrosion rate than oxygenated treated water). Applying this corrosion rate projects a reduction in MSIV wall thickness during flooded periods of 3.3 mils (0.0033 inches) over 60 years.

If the average duration of a refueling outage is assumed to be 60 days (i.e., twice the length of a typical planned outage for NMP2), MSIVs would be exposed to an air environment for 56 days every 2 years; this results in projected cumulative exposure of 1680 days (4.6 years) over a 60-year lifetime. A corrosion rate of 3.3 mils per year (from Table 3, p. 510 of Reference 4.8-70; based on the median atmospheric corrosion rate for carbon steel) is assumed for those periods when the MSIV bodies are exposed to air, and the corresponding reduction in wall thickness is 15.2 mils (0.0152 inches) over 60 years.

The CHECWORKS software used for modeling FAC predicts average wear rates in the range of 0.09 to 0.13 mils per year for representative components in the main steam system during plant operation. Applying the highest of these expected wear rates for the remaining 54.74 years of a 60-year service life results in a reduction in MSIV wall thickness of only 7.12 mils (0.00712 inches).

By summing the three values computed above, a total loss in wall thickness over 60 years of 0.0256 inches is obtained. The amount of wall thinning based on maximum expected corrosion rates of the MSIV bodies remains bounded by the corrosion allowance assumed in the design of these valves. Therefore, the corrosion allowance calculation for the NMP2 MSIV bodies remains valid for the period of extended operation in accordance with §54.21(c)(1)(i).

4.7.3 STRESS RELAXATION OF CORE PLATE HOLD-DOWN BOLTS (NMP2 ONLY)

Summary Description

Hold-down bolts located around the rim of the core plate are subcomponents of the core plate assembly that ensure the core plate safety function. Preload in these bolts could be reduced over time by the effects of IGSCC and fluence; thus, Reference 4.8-71 determined that loss of preload should be evaluated as a potential TLAA.

In BWR/2 through BWR/5 RPV designs without core plate wedges installed, these bolts are required to provide lateral restraint of the core plate in the event of a worst-case weld failure. For plants with this configuration, BWRVIP-25 recommends visual or ultrasonic examination of 50% of the hold-down bolts.

NMP1 has core plate wedges installed; therefore, examination of the core plate hold-down bolts is not required. However, an analysis to justify deferral of the recommended examination until RFO10 for NMP2 satisfies the criteria of §54.3(a); as such, this analysis is a TLAA.

Analysis

NMP2 has implemented all relevant BWRVIP-required inspections as augmented inservice inspections in accordance with applicable ASME Code requirements. The existing analysis of loss of preload in the NMP2 hold-down bolts determined that sufficient preload remains to justify deferral of the recommended examination until RFO10.

Disposition: §54.21(c)(1)(iii) – The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

The subject analysis considered loss of preload caused by both IGSCC and fluence. A review of the associated calculations and the design basis loads indicates the following:

- The predicted amount of stress relaxation due to IGSCC is insignificant through the end of the period of extended operation.

- When the effect of fluence through the period of extended operation is considered, the remaining preload is sufficient to withstand all normal and upset condition loadings, but insufficient to withstand the faulted condition loading. Even with no loss of preload due to fluence, the calculation showed very little margin between the initial preload and the required preload under faulted conditions. The conclusion to the calculation indicates that reconciliation is necessary in determining why so little margin exists between required and applied preload.

Due to the difficulty encountered by the industry in performing the recommended inspections, the BWRVIP is also pursuing an analytical solution to the issue of stress relaxation of core plate hold-down bolts that may demonstrate sufficient remaining preload to withstand all design loadings until the end of extended life.

The potential for cracking of components comprising the reactor vessel internals due to IGSCC is managed by the BWR Vessel Internals Program at NMP2, which incorporates comprehensive inspection and evaluation guidelines issued by the BWRVIP and approved by the NRC (refer to Appendix B2.1.8). Prior to the end of the current license period, NMP2 will either:

(1) Install core plate wedges (as part of a proposed core shroud tie-rod repair) to eliminate the need for the enhanced inspections of the core plate hold-down bolts recommended by BWRVIP-25; or

(2) Perform an analysis (incorporating detailed flux/fluence analyses and improved stress relaxation correlations) to demonstrate that the core plate hold-down bolts can withstand all normal, emergency, and faulted loads considering the effects of stress relaxation, until the end of the period of extended operation.

These activities provide assurance that any stress relaxation of the NMP2 core plate hold-down bolts will be adequately managed for the period of extended operation in accordance with §54.21(c)(1)(iii).

4.7.4 REACTOR VESSEL AND REACTOR VESSEL CLOSURE HEAD WELD FLAW EVALUATIONS (NMP1 ONLY)

Summary Description

During RFO15, augmented examinations identified unacceptable flaw indications in two RPV shell welds (Reference 4.8-72). During RFO17, UT examinations identified an unacceptable flaw indication in a closure head meridional weld (Reference 4.8-73). Structural evaluations of these flaws (performed in accordance with ASME Section XI, Subsection IWB-3600) compared the flaw characteristics to pre-determined acceptability criteria to justify continued operation without repair of the flaw. Since the acceptability criteria were applicable only through the original 40-year license term, the subject evaluations satisfy the criteria of §54.3(a). As such, these analyses are TLAAs.

Analysis

Unacceptable indications in the RPV shell are located in axial weld RVWD-140 and shell-to-flange circumferential weld RVWD-099. The detected flaws are subsurface planar flaws located parallel to the centerline of the weld (i.e., the indications in RVWD-140 were axially-oriented and the indications in RVWD-099 were circumferentially-oriented). The flaw evaluations considered fatigue crack growth and irradiation embrittlement (only applicable for the beltline weld, RVWD-140) to 28 EFPY (Enclosure 2 to Reference 4.8-72). The NRC reviewed the original evaluations and concurred that continued operation with these flaws is acceptable through 28 EFPY, the end of the current license term (Reference 4.8-74). In 2002, these evaluations were reconciled to the pressure test conditions associated with updated P-T limit curves; the previously detected flaws remain acceptable when compared to the updated (lower) allowable flaw sizes at 28 EFPY.

The unacceptable indication in the closure head is located in weld RVWD-005 and characterized as a subsurface planar flaw. The flaw evaluation considered fatigue crack growth due to 240 startup/shutdown cycles (the number of design startup/shutdown cycles for the original 40-year operating term) and determined the flaw to be acceptable for continued service (Reference 4.8-73).

Disposition: §54.21(c)(1)(i) – The analyses remain valid for the period of extended operation;
AND
§54.21(c)(1)(iii) – The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

The number of cycles from the time of inspection to the end of the evaluation period is used to determine crack growth (enclosure to Reference 4.8-73). With the addition of the period of extended operation (20 years), the NMP1 RPV can be expected to accumulate fatigue usage for no more than 25 additional years. During this interval, it is unlikely that 240 additional startup/shutdown cycles will occur. Therefore, the RPV closure head weld flaw evaluation remains valid for the period of extended operation in accordance with §54.21(c)(1)(i).

Evaluation, reexamination, and repairs associated with identified flaw indications are controlled under the NMP1 ASME Inservice Inspection (Subsections IWB, IWC, IWD) Program, which manages aging of all Class 1, 2, and 3 pressure-retaining components and their integral attachments (refer to Appendix B2.1.1). Prior to the period of extended operation, the RPV weld flaw evaluations will be revised to consider additional fatigue crack growth and the effects of additional irradiation embrittlement (for beltline materials) associated with operation for an additional 20 years (i.e., out to at least 46 EFPY). If the revised calculation shows the identified flaws cannot meet the applicable acceptance criteria, the indications will be reexamined in accordance with ASME Section XI requirements. These activities provide assurance that the potential growth of identified flaws in the RPV welds will be adequately managed for the period of extended operation in accordance with §54.21(c)(1)(iii).

4.8 REFERENCES

4.8-1 NUREG-1800, *Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants*, July 2001.

4.8-2 NEI 95-10, Revision 4, *Industry Guidelines for Implementing the Requirements of 10 CFR 54 – The License Renewal Rule*, October 2003.

4.8-3 Letter from U.S. Nuclear Regulatory Commission to Nuclear Energy Institute and Union of Concerned Scientists dated May 12, 2003, *Subject: Proposed Interim Staff Guidance (ISG)-16: Time-Limited Aging Analyses (TLAAs) Supporting Information For License Renewal Applications*.

4.8-4 EPRI 1008872, *BWRVIP-74-A: BWR Vessel and Internals Project, BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines for License Renewal*, June 2003.

4.8-5 Letter from U.S. Nuclear Regulatory Commission to BWRVIP Chairman dated October 18, 2001, *Subject: Acceptance for Referencing of EPRI Proprietary Report TR-113596, BWR Vessel and Internals Project, BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines (BWRVIP-74-A) and Appendix A, Demonstration of Compliance with the Technical Information Requirements of the License Renewal Rule (10CFR54.21)*.

4.8-6 Generic Letter 92-01, Revision 1, *Reactor Vessel Structural Integrity, 10 CFR 50.54(f)*, March 6, 1992.

4.8-7 Generic Letter 88-11, *NRC Position on Radiation Embrittlement of Reactor Vessel Materials and its Impacts on Plant Operation*, July 12, 1988.

4.8-8 Letter from Niagara Mohawk Power Corporation (NMP1L 0677) to U.S. Nuclear Regulatory Commission dated July 2, 1992, *Subject: Generic Letter 92-01, Revision 1, Reactor Vessel Structural Integrity, 10 CFR 50.54(f)*.

4.8-9 Letter from Niagara Mohawk Power Corporation (NMP2L 1347) to U.S. Nuclear Regulatory Commission dated July 2, 1992, *Subject: Generic Letter 92-01, Revision 1, Reactor Vessel Structural Integrity, 10 CFR 50.54(f)*.

4.8-10 Regulatory Guide 1.99, Revision 2, *Radiation Embrittlement of Reactor Vessel Materials*, May 1988.

4.8-11 Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated March 30, 1994, *Subject: Generic Letter (GL) 92-01, Revision 1, Reactor Vessel Structural Integrity, Nine Mile Point Nuclear Station Unit No. 1 (NMP-1) (TAC No. M83486)*.

4.8-12 Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated March 30, 1994, *Subject: Generic Letter (GL) 92-01, Revision 1, Reactor Vessel Structural Integrity, Nine Mile Point Nuclear Station, Unit 2 (TAC No. M83487)*.

4.8-13 Letter from Niagara Mohawk Power Corporation (NMP1L 0723) to U.S. Nuclear Regulatory Commission dated December 17, 1992, *Subject: Generic Letter 92-01, Revision 1, Reactor Vessel Structural Integrity, 10 CFR 50.54(f), Elastic-Plastic Fracture Mechanics Assessment*.

4.8-14 Letter from Niagara Mohawk Power Corporation (NMP1L 0739) to U.S. Nuclear Regulatory Commission dated February 26, 1993, *Subject: Generic Letter 92-01, Revision 1, Reactor Vessel Structural Integrity, Elastic-Plastic Fracture Mechanics Assessment For Service Level C and D Loadings*.

4.8-15 Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated April 20, 1994, *Subject: Elastic Plastic Fracture Mechanics Assessment of Nine Mile Point Nuclear Station Unit No. 1 Reactor Vessel Beltline Plates (TAC No. M86107)*.

4.8-16 Letter from U.S. Nuclear Regulatory Commission to Nine Mile Point Nuclear Station, LLC, dated October 27, 2003, *Subject: Nine Mile Point Nuclear Station, Unit No. 1 – Issuance of Amendment Re: Pressure-Temperature Limit Curves and Tables (TAC No. MB6687).*

4.8-17 Letter from U.S. Nuclear Regulatory Commission to Nine Mile Point Nuclear Station, LLC, dated January 27, 2004, *Subject: Nine Mile Point Nuclear Station, Unit No. 2 – Issuance of Amendment Re: Pressure-Temperature Limit Curves (TAC No. MC0331).*

4.8-18 Letter from Niagara Mohawk Power Corporation (NMP1L 1004) to U.S. Nuclear Regulatory Commission dated November 20, 1995, *Subject: Generic Letter 92-01, Revision 1, Supplement 1, Reactor Vessel Structural Integrity.*

4.8-19 Letter from Niagara Mohawk Power Corporation (NMP1L 1358) to U.S. Nuclear Regulatory Commission dated September 4, 1998, *Subject: Request for Additional Information Regarding Reactor Pressure Vessel Structural Integrity at Nine Mile Point Nuclear Station Unit 1 (TAC No. MA1200)*.

4.8-20 Letter from Niagara Mohawk Power Corporation (NMP2L 2015) to U.S. Nuclear Regulatory Commission dated March 8, 2001, *Subject: 10CFR50, Appendix H, Reactor Vessel Material Surveillance Program Requirements, Report of Test Results*.

4.8-21 Letter from Nine Mile Point Nuclear Station, LLC, (NMP1L 1697) to U.S. Nuclear Regulatory Commission dated November 15, 2002, *Subject: License Amendment Request Pursuant to 10 CFR 50.90: Revision of Reactor Pressure Vessel Pressure-Temperature Limits and Request for Exemption from Requirements of 10 CFR 50.60 TAC Nos. MB6687 and MB6703*.

4.8-22 Letter from Nine Mile Point Nuclear Station, LLC, (NMP2L 2096) to U.S. Nuclear Regulatory Commission dated August 15, 2003, *Subject: Nine Mile Point Unit 2, Docket No. 50-410 – License Amendment Request Pursuant to 10 CFR 50.90: Revision of Reactor Pressure Vessel Pressure-Temperature Limits*.

4.8-23 Letter from U.S. Nuclear Regulatory Commission to Nine Mile Point Nuclear Station, LLC, dated January 29, 2004, *Subject: Nine Mile Point Nuclear Station, Unit No. 2 – Correction of Amendment No. 110, Pressure-Temperature Limit Curves (TAC No. MC0331)*.

4.8-24 Letter from Niagara Mohawk Power Corporation (NMP1L 1377) to U.S. Nuclear Regulatory Commission dated November 6, 1998, *Subject: Pressure-Temperature Curves*.

4.8-25 Letter from Niagara Mohawk Power Corporation (NMP1L 1373) to U.S. Nuclear Regulatory Commission dated October 22, 1998, *Subject: Generic Letter 94-03, Intergranular Stress Corrosion Cracking of Core Shrouds in Boiling Water Reactors.*

4.8-26 Letter from Niagara Mohawk Power Corporation (NMP2L 1595) to U.S. Nuclear Regulatory Commission dated November 20, 1995, *Subject: Generic Letter 92-01, Revision 1, Supplement 1, “Reactor Vessel Structural Integrity.”*

4.8-27 Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated April 7, 1999, *Subject: Alternatives for Examination of Reactor Pressure Vessel Shell Welds, Nine Mile Point Nuclear Station, Unit 1 (TAC No. MA4383)*.

4.8-28 Letter from Niagara Mohawk Power Corporation (NMP1L 1391) to U.S. Nuclear Regulatory Commission dated December 10, 1998, *Subject: Proposed Alternatives for Examination of Reactor Pressure Vessel Shell Welds*.

4.8-29 Letter from U.S. Nuclear Regulatory Commission to BWRVIP Chairman dated July 28, 1998, *Subject: Final Safety Evaluation of the BWR Vessel and Internal Project BWRVIP-05 Report (TAC No. M93925).*

4.8-30 Letter from Niagara Mohawk Power Corporation (NMP1L 0747) to U.S. Nuclear Regulatory Commission dated March 19, 1993, *Subject: Generic Letter 92-01, Revision 1, Reactor Vessel Structural Integrity, Upper Shelf Energy Estimates for Beltline Welds*.

4.8-31 Letter from Nine Mile Point Nuclear Station, LLC, (NMP1L 1749) to U.S. Nuclear Regulatory Commission dated July 31, 2003, *Subject: Request for Additional Information (RAI) – Amendment Application Re: Pressure-Temperature Limit Curves (TAC Nos. MB6687 and MB6703)*.

4.8-32 Letter from U.S. Nuclear Regulatory Commission to BWRVIP Chairman dated March 7, 2000, *Subject: Supplement to Final Safety Evaluation of the BWR Vessel and Internals Project BWRVIP-05 Report (TAC No. MA3395)*.

4.8-33 Nine Mile Point Nuclear Station Unit 1 Final Safety Analysis Report (Updated), Revision 18.

4.8-34 Nine Mile Point Nuclear Station Unit 2 Updated Safety Analysis Report, Revision 15.

4.8-35 NUREG/CR-6260, INEL-95/0045, *Application of NUREG/CR-5999 Interim Fatigue Curves to Selected Nuclear Power Plant Components*, February 1995.

4.8-36 NUREG-0619, Revision 1, *BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking: Resolution of Generic Technical Activity A-10 (Technical Report)*, November 13, 1980.

4.8-37 Letter from Niagara Mohawk Power Corporation to U.S. Nuclear Regulatory Commission dated June 5, 1984, regarding improvement to the Nine Mile Point Unit 1 Low Flow Feedwater Control System.

4.8-38 Letter from Niagara Mohawk Power Corporation (NMP1L 0829) to U.S. Nuclear Regulatory Commission dated June 23, 1994, *regarding amendment of a NMP1 commitment with respect to NUREG-0619*.

4.8-39 Letter from Niagara Mohawk Power Corporation (NMP1L 1489) to U.S. Nuclear Regulatory Commission dated December 13, 1999, *Subject: NUREG-0619 Inspection Reporting for NMP1 RPV Feedwater and CRDRL Nozzle Examinations - 1999 Refueling Outage (RFO15)*.

4.8-40 Letter from Niagara Mohawk Power Corporation (NMP2L 1976) to U.S. Nuclear Regulatory Commission dated July 18, 2000, *Subject: Inservice Inspections (ISI) Summary Report*.

4.8-41 Letter from Niagara Mohawk Power Corporation (NMP2L 1518) to U.S. Nuclear Regulatory Commission dated January 3, 1995, *Subject: Proposed License Amendment - Uprated Operation, Response to Request for Additional Information*.

4.8-42 Letter from Niagara Mohawk Power Corporation (NMP1L 1422) to U.S. Nuclear Regulatory Commission dated April 14, 1999, *Subject: Request for Additional Information Regarding Contingency Repair Plans for the Core Shroud Vertical Welds, Nine Mile Point Nuclear Station Unit 1 (NMP1).*

4.8-43 Letter from Niagara Mohawk Power Corporation (NMP1L 0894) to U.S. Nuclear Regulatory Commission dated January 23, 1995, *Subject: Generic Letter 94-03, 'Intergranular Stress Corrosion Cracking of Core Shrouds in Boiling Water Reactors' (TAC No. M90102).*

4.8-44 Letter from Niagara Mohawk Power Corporation (NMP1L 1436) to U.S. Nuclear Regulatory Commission dated May 21, 1999, *Subject: Generic Letter 94-03, 'Intergranular Stress Corrosion Cracking of Core Shrouds in Boiling Water Reactors,' Request for Approval Under the Provision of 10CFR50.55a(a)(3)(i) for Modification of the Four Stabilizer Assemblies (Tie-Rods) for Nine Mile Point Unit 1 (NMP1)*.

4.8-45 U.S. Nuclear Regulatory Commission Memorandum from Ashok Thadani to William Travers dated December 26, 1999, *Subject: Closeout of Generic Safety Issue 190, 'Fatigue Evaluation of Metal Components for 60-Year Plant Life.*

4.8-46 NMP1L 1823, Letter from William C. Holston to NRC, *Subject: Evaluation of Upper Shelf Fracture Toughness of the Nine Mile Point Unit 1 Reactor Vessel per 10 CFR 50, Appendix G*, March 22, 2004

4.8-47 (deleted)

4.8-48 (deleted)

4.8-49 Letter from Niagara Mohawk Power Corporation (NMP1L 1284) to U.S. Nuclear Regulatory Commission dated January 30, 1998, *Subject: LER 97-10, Supplement 1 – Docket No. 50-220*.

4.8-50 Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated November 13, 1992, *Subject: Safety Evaluation of Responses to NRC Bulletin 88-08 and Supplements for Nine Mile Point Nuclear Station, Unit No. 1 (TAC No. M69655)*.

4.8-51 Letter from Niagara Mohawk Power Corporation to U.S. Nuclear Regulatory Commission dated May 31, 1984, forwarding a status of the Environmental Qualification Program for Nine Mile Point Unit 1.

4.8-52 Letter from Niagara Mohawk Power Corporation (NMP2L 0822) to U.S. Nuclear Regulatory Commission dated August 18, 1986, regarding the Equipment Qualification Program for NMP2.

4.8-53 Letter from Niagara Mohawk Power Corporation (NMP2L 0833) to U.S. Nuclear Regulatory Commission dated August 21, 1986, regarding the Equipment Qualification Program for NMP2.

4.8-54 Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated January 10, 1985 forwarding a Safety Evaluation of electric equipment important to safety for Nine Mile Point, Unit No. 1 for compliance with the requirements of 10 CFR 50.49

4.8-55 NUREG-1047, Supplement 4, *Safety Evaluation Report Related to the Operation of Nine Mile Point Nuclear Station, Unit No. 2*, September, 1986.

4.8-56 Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated October 25, 1983, *Subject: Summary of Meeting with Niagara Mohawk Power Corporation on Deviations from the Standard Review Plan (NUREG-0800) for Nine Mile Point Nuclear Station, Unit 2.*

4.8-57 (deleted)

4.8-58 Letter from Niagara Mohawk Power Corporation (NMP2L 0391) to U.S. Nuclear Regulatory Commission dated April 22, 1985, forwarding a revision to the Environmental Qualification Document for NMP2.

4.8-59 NUREG-0661, *Mark I Containment Long Term Program Safety Evaluation Report, Resolution of Generic Technical Activity A-7*, July 1980.

4.8-60 Letter from Niagara Mohawk Power Corporation to U.S. Nuclear Regulatory Commission dated November 10, 1983, forwarding the *Plant Unique Analysis Report of the Torus Suppression Chamber for Nine Mile Point Unit 1 Nuclear Generating Station*

4.8-61 Letter from Niagara Mohawk Power Corporation to U.S. Nuclear Regulatory Commission dated May 22, 1984 forwarding the *Plant Unique Analysis Report of the Torus Attached Piping for Nine Mile Point Unit 1 Nuclear Generating Station*

4.8-62 Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated January 22, 1985, *Subject: Mark I Containment Long Term Program*.

4.8-63 Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated August 11, 1994, *Subject: Approval of Reduction Factors for Condensation Oscillation Loads in Nine Mile Point Nuclear Station Unit No. 1 (NMP1) Torus (TAC No. M85003)*.

4.8-64 Letter from Niagara Mohawk Power Corporation (NMP1L 0583) to U.S. Nuclear Regulatory Commission dated May 14, 1991, regarding re-definition of the condensation oscillation load for the NMP1 torus.

4.8-65 Letter from Niagara Mohawk Power Corporation to U.S. Nuclear Regulatory Commission dated August 1, 1980 forwarding the final report concerning the Nine Mile Point Unit 2 biological shield wall in accordance with 10 CFR 50, paragraph 50.55(e)(3).

4.8-66 Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated November 8, 1985, *Subject: Inspection No. 50-410/85-29*.

4.8-67 SAND92-2420, MEA-2494, *Accelerated 54°C Irradiated Test of Shippingport Neutron Shield Tank and HFIR Vessel Materials*, January 1993.

4.8-68 NUREG-1047, *Safety Evaluation Report Related to the Operation of Nine Mile Point Nuclear Station, Unit No. 2*, February, 1985.

4.8-69 Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated May 15, 1987, forwarding Amendment No. 2 to Facility Operating License No. NPF-54, related to the main steam isolation valves (MSIVs)

4.8-70 ASM Handbook (Volume 13), *Corrosion*, 1987.

4.8-71 Letter from U.S. Nuclear Regulatory Commission to BWRVIP Chairman dated December 7, 2000, *Subject: Safety Evaluation for Referencing of BWR Vessel and Internals Project, BWR Core Plate Inspection and Flaw Evaluation Guidelines (BWRVIP-25) Report for Compliance with the License Renewal Rule (10 CFR Part 54) and Appendix B, BWR Core Plate Demonstration of Compliance with the Technical Information Requirements of the License Renewal Rule (10 CFR 54.21)*.

4.8-72 Letter from Niagara Mohawk Power Corporation (NMP1L 1467) to U.S. Nuclear Regulatory Commission dated September 14, 1999, *Subject: Submittal of 1999 Inservice Inspection Summary Report and Flaw Indication Evaluations.*

4.8-73 Letter from Nine Mile Point Nuclear Station, LLC, (NMP1L 1776) to U.S. Nuclear Regulatory Commission dated September 19, 2003, *Subject: Nine Mile Point Unit 1, Docket No. 50-220, Facility Operating License No. DPR-63 – Reactor Pressure Vessel Flaw Evaluation*.

4.8-74 Letter from U.S. Nuclear Regulatory Commission to Niagara Mohawk Power Corporation dated May 5, 2000, *Subject: Nine Mile Point Nuclear Station, Unit No. 1 – Evaluation of Flaw Indications in Reactor Pressure Vessel Welds (TAC No. MA6510)*.

4.8-75 Letter from Niagara Mohawk Power Corporation (NMP1L 1200) to U.S. Nuclear Regulatory Commission dated April 8, 1997, *Subject: Generic Letter 94-03, 'Intergranular Stress Corrosion Cracking (IGSCC) in Boiling Water Reactors.'*

4.8-76 Letter from Niagara Mohawk Power Corporation (NMP1L 1331) to U.S. Nuclear Regulatory Commission dated June 19, 1998, regarding application for amendment to the NMP1 operating license re: P-T curves.

4.8-77 NMP1L 1299, *10 CFR 50, Appendix H, Subject: Reactor Vessel Material Surveillance Program Requirements, Report of Test Results*, March 31, 1998

4.8-78 NMP2L 1942, Letter from Richard B. Abbott to NRC *Subject: Proposed Alternative for Contingency Repair of Certain Reactor Pressure Vessel Nozzles per Generic Letter 88-01*, March 7, 2000

4.8-79 Letter from Marsha Gamberoni, NRC, to Mr. John H. Mueller, NMPC, *Subject: Nine Mile Point Nuclear Station Unit No. 2 (NMP2) – Alternative to American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Requirements for Repair of Recirculation and Feedwater Nozzle to Safe-End Welds at NMP2 (TAC No. MA8352)*, March 30, 2000